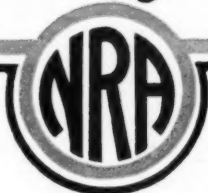


The AMERICAN RIFLEMAN

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NUMBEN 8

SEPTEMBER 15, 1923

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By W. J. Morden

The 250-3000 on Lion and Bear

By Allyn Tedmon

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British Small Bore Riflemen

win with

Remington Palma

Even in Great Britain, where Small-Bore Rifle Shooting is a national sport, Remington Palma .22 Long Rifle Cartridges are used by the majority of small-bore riflemen. The reason for this is undoubtedly the high and uniform accuracy of these excellent cartridges.

We give below some recent winnings at the National Small-Bore Meeting of the Society of Miniature Rifle Clubs, Bisley, England, July 9-14, including the results of the International DeWar Cup Competition between Great Britain and the United States. It should be noted that 12 of the 26 competitions were won with Remington Palma.

DEWAR CUP INTERNATIONAL TEAM MATCH

Great Britain vs. United States

1. H. E. Turner.....	393 Palma	11. H. E. Watts.....	382 Palma
2. H. D. Buck.....	393	12. A. Tyerman.....	382
3. H. S. Longhurst.....	391	13. Lt. Col. C. Alington.....	382
4. A. E. Hall.....	390 Palma	14. H. S. Trott.....	382 Palma
5. A. Jarman.....	390	15. A. Traies.....	380 Palma
6. F. W. Privett.....	389 Palma	16. L. MacGregor.....	378 Palma
7. W. T. Norton.....	387	17. J. J. Hare.....	378 Palma
8. J. W. Grant.....	385	18. A. Eccles.....	376 Palma
9. B. Robertson.....	384 Palma	19. J. Cole.....	376 Palma
10. F. C. Hale.....	383	20. W. Samways.....	372 Palma

British Team, Total 7672

INDIVIDUAL COMPETITIONS

Earl Roberts Memorial Challenge Cup.....	1st Palma
The "Bell" Challenge Trophy.....	1st, 2nd and 3rd Palma
The Nobel S. M. R. C. Challenge Cup.....	1st Palma
The Vickers Challenge Shield.....	1st Palma
The Lockhart Ross, Oxo Challenge Cup.....	1st Palma
The B. S. A. New Zealand Challenge Shield.....	2nd and 3rd Palma
The Bennett Benjafield Challenge Trophy.....	3rd Palma
The Winchester British Commercial G. A. Challenge Cup.....	1st Palma
The Elkington.....	1st Palma
The Parke-Rifle-Alities Bonehill Challenge Cup.....	1st Palma
The Waterlow. The Tyros.....	1st Palma
The Greener. The Police.....	1st Palma
The Ladies. Daily Mirror Cup.....	1st and 2nd Palma

It has been a wonderful year for Remington loaded shells and metallic cartridges. Remington Game Loads have solved the problems of the duck and field shooter, while Remington Hi-Speed cartridges have earned a permanent place with the American Big Game Sportsman.

The highest honor of all, however, was the stamp of official U. S. Government approval awarded Remington Palma 30-'60 Match ammunition in the Government test at Quantico, Va.

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WASHINGTON, D. C., SEPTEMBER 15, 1923

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Sea Girt's 31st Tournament

New Jersey Matches See Breaking Of World's Record For Long Runs

By Kendrick Scofield

RECORDS are made only to be broken. When Sergt. T. B. Crawley of the Marines sent 176 consecutive bullets into the bulls-eye over the 800-yard range at Camp Perry in 1921, the ultimate of sustained accuracy was believed to have been reached—at least for many years to come. But now the unbelievable, which strains credulity, has occurred. The world's long-run record now stands at 201 consecutive bulls-eyes as the result of the most sensational shooting under match conditions ever recorded.

The holder of the new record is Edward Doyle, Sergeant of Marines. In accomplishing his unprecedented feat during the Sea Girt Interstate Tournament, he not only established a long run record, but also a record for the 500 yards range, and for the 500 yards range on the 16-inch bulls-eye. The run also is unfinished, Doyle being still in the bulls-eye and going strong when, on account of physical discomfort he chose to retire from the Swiss Match, in which event he was shooting.

With the big Marine Corps team squad whose members had moved down from Wakefield on the way to Camp Perry, and the Infantry Team Squad from Fort Niagara, reinforced by the New York and New Jersey National Guard contingents on the ground, the Sea Girt

Meeting of 1923 started off August 27th.

Through the days of shooting which followed the Marines and the Infantrymen, as was expected, divided honors, but the division was noticeably apparent, in that the Marines took most of the Individual events, while to the Doughboys fell the victories in such difficult team competitions as the Dryden and the McAlpin. Both of these teams, who are the logical headliners in the greatest of all marksmanship contests—The National Team Match—showed unusual interest in making this year's Sea Girt Tournament a success, especially the Infantrymen, who on leaving Fort Niagara pooled their personal resources, crowded into the automobiles belonging to some of the squad members and came to Sea Girt at their own expense, depending upon a pool of the team's winnings to take care of expenses.

Long before the shooters reached the firing line a troop of Boy Scouts from Trenton, brought down to man the range, lined up in front of the range house under the command of a gangling youth who limped about in huge lumberman's boots, ordering those smaller than he about in strident tones.

"This ain't where we was to form," a small Scout burdened down with two large canteens, protested.

"Shut up!" the leader yelled. "Fall in there or I'll——"

But he was interrupted by a quiet voiced range officer admonishing the booted leader: "I told you to line 'em up behind the Range House."

"Yeah! Smarty! Knew so much, didn't yer? Yea-h-h!" came a chorus of derision from the boys, as they snapped to attention and their protests vindicated, marched off to the pits, the fallen leader shuffling behind them, the tops of his lumberman's boots flapping about his skinny shanks. The match was on, and incidentally had started off right so far as the pit boys were concerned, for through the entire



Sgt. Edward Doyle
U. S. M. C.

meeting the Scouts came through with the snappiest kind of pit operation marking the score.

UNDER typical Sea Girt conditions, and with nothing of especial interest save good average shooting to mark their progress, the Company Team, Eisner, Hayes, and Wingate Matches were disposed of in the first day of shooting. Of the Individual Matches, the Eisner was taken by Capt. J. A. Kneubel of the Infantry on a score of 97 for 10 shots, each standing and kneeling at 200 yards; the Hayes Match—2 sighters and 10 shots for record at 600 yards—went to Sergt. W. F. Lay of the Infantry on a possible plus 11 bulls-eyes, which did not disturb the existing record; while the Wingate—10 shots at 200 yards off-hand at the bobbing target—was taken by Lieut. O'Mohundro of the Infantry on 20 consecutive hits.

The second day of the meeting, with the 71st Regiment and the Interstate Regimental Team Matches scheduled, with the Gould Rapid Fire and the Meany Matches would, like the first day, have been simply good shooting except that seven of the competitors in the Meany—2 sighters and 10 shots for record at 500 yards went clean and started runs of additional bulls-eyes. Marine Gunner C. A. Lloyd, who holds the record of 101 bulls-eyes at 600 yards—got away to a good start and ran 23 additional bulls-eyes at 500 yards on the 16-inch black, before he nipped out, taking the event. The Gould Rapid Fire Match was notable because it required two shoot-offs to establish the winner. The first run resulted in possible scores through twentieth place. The first shoot-off left four competitors tie for first, six tied for second, and five tied for third. These ties were broken only on the third run, leaving Lieut. Jones of the Infantry winner.

During the night a typical Sea Girt rain began brewing and the range was drenched during all of the third day's shooting, for which was scheduled the Sea Girt National Team, the Rogers, the Roe, and the Swiss Matches. Fortunately for the sake of the record which was later to be made, the Swiss Match was postponed.

The first of the big team matches of the meeting—the Sea Girt National Team—following the National Match course, was taken by the First Marine Corps Team on a score of 2837 points, 26 better than that made by the Second Marine Corps Team which outranked the Infantrymen who had a similar total. Unfavorable weather conditions kept this match from piling up any remarkable scores, but it served to whip the teams into competition form.

The Rogers and the Roe Matches—the first being fired at 600 yards, and the second at 1,000 yards—opened an opportunity for some long and perhaps record-breaking runs, but the weather interfered and the best that came out of the mid-range event was added evidence that Sergt. J. M. Thomas of the Marines is going to be a dangerous competitor in the All-Around at Camp Perry, upon which he has set his heart, the Sergeant winning the event

on a run of 58 bulls-eyes. Privt. G. D. White of the Marines, in the 1,000-yard event, got started well and ran 11 bulls-eyes over the possible, while under the weather conditions the best that any of his rivals could do was 99. And so that crowd which had been gathering for every individual match hopeful of witnessing another record-breaker was again disappointed.

But during the first three days of the matches the stage was being set for a record as unexpected as it was astounding. When the windless calm of sunset falls over the green sketches of Sea Girt, and the Spencer, the Libbey, the Roe, or some of the other long range matches are being shot, crowds gather in anticipation of witnessing a long run of bulls-eyes. But Sea Girt forenoons are notorious for hard light and difficult wind conditions.

The postponed schedule of the Swiss Match, a historic "miss-and-out" event, in which the list of previous winners include the names of such hard-holders as Richard, Chesley, Blade, Hession, Adkins, and Andrews, saw the four-score entrants in this year's contest gather on the firing line where the salt-marsh mists and sun-glare combined with a 15-mile wind to make the event difficult.

During the first two hours the going was very hard and few contestants put over better than a dozen straight bulls-eyes. Then Virgil Richard of the Quinnipiac Club ran 21 bulls-eyes, but only to be displaced by Captain Tupper of the Infantry, who hung on for a run of 23. Under the conditions this appeared to be the winning score, although the wind was falling a little and the light slightly improving.

Edward John Doyle, Sergeant of Marines, and known as one of the most dependable of team shots, although never having particularly distinguished himself as an individual star, lay down to shoot his record at 12 minutes after 10 o'clock. In his shooting bag he had four boxes of this year's Remington Palma ammunition. At first the light bothered him, but he shot with machine-like precision, averaging about 40 seconds to each shot. His first sighter was a 3; his second put him well into the black. By the time he had fired his first box of cartridges, the wind and the light had both improved, the wind holding fairly steadily between 12 and 15 miles an hour, and a gallery began to gather as the word went around that Tupper's score had been bettered. A range officer was called and the shooting continued.

The machine-like precision which characterized Doyle's firing was at this time very apparent. Doyle would load, fire slowly, open the bolt and carefully pick out the empty shell with his fingers, laying it to one side in an ever-growing row, and then bending over, he would peer through his scope, waiting for the marker to appear at the target. This precision of movement coincided splendidly with the snappy service in the pit.

On either side of him, up and down the line, other competitors were dropping out with eight, ten, or twelve bulls-eyes, but

Doyle plugged on, undisturbed by wind and light that were defeating other experienced shots. When his Springfield had pounded his shoulder for the eighteenth time, Doyle was out of ammunition, but long before that other cartons had been brought to the firing line and fed up to him, one box at a time.

As the white disc appeared at the pit for the one-hundredth time, Doyle asked Captain Humphries of the Marine Team whether he should stop.

"Make it two hundred," came cries from the gallery and the stocky young Marine went doggedly back to his task.

Forty-eight more shots, each one well within the bull—and then a nipper.

The gallery for a moment relaxed. It was over. But no. From the pit came the word that while the 149th shot was out, it still had clearly cut the line, and with the 150th crack of the Marine's rifle the tenseness settled again over the gallery.

By this time Doyle was showing visible evidence of the strain he was under. Gone was much of the machine-like precision. With every bark of his rifle he would jerk open the bolt and send the shell spinning out rolling his head wearily over to his scope. His back muscles wrenched by successive jars, began paining him. His vision was tiring. But two hundred bulls-eyes had been called for and Doyle set himself a little closer to the ground to deliver the goods.

One of the few changes which he made in his sights during the entire run brought his bullets back into the center of the bull, and the scorekeeper continued chalking up Fives.

Sergeant Doyle's One Hundred and Seventy-ninth shot—"A Five," droned the scorekeeper.

Crawley's world record for a long run, made at Camp Perry on the camouflaged bulls-eye in 1921 was broken!

The crack of the rifle, the marking of the target, the call of the scorer, the noon hour passing while the Marine, fought aching muscles and blurring vision, driving every ounce of concentration to the control and co-ordination of brain and rifle.

Fifteen minutes after Twelve. "Sergeant Doyle's Two Hundredth shot for record—A Five."

"Shall I continue, sir?" Doyle called to Captain Humphries.

"Do as you please about it," his commander replied.

"Well, I guess that's enough for me" the shooter decided, as he eased his muscles out of cramp and gathered up his shooting bag while the gallery gathered to congratulate him.

The new world's long run record of 201 consecutive bulls-eyes—counting Doyle's second sighter—is beyond all doubt the most impressive feat ever recorded in rifle shooting, as an exhibition of unparalleled sustained accuracy. How long it will remain the record is problematical, but that detracts not at all from the high degree of skill and muscular control exhibited by Doyle.

At the start the fact that the event was a "miss-and-out" match might have been expected.

(Concluded on page 20)

American Heavy Caliber Rifles for Large Game

By Townsend Whelen

THE .35 WHELEN

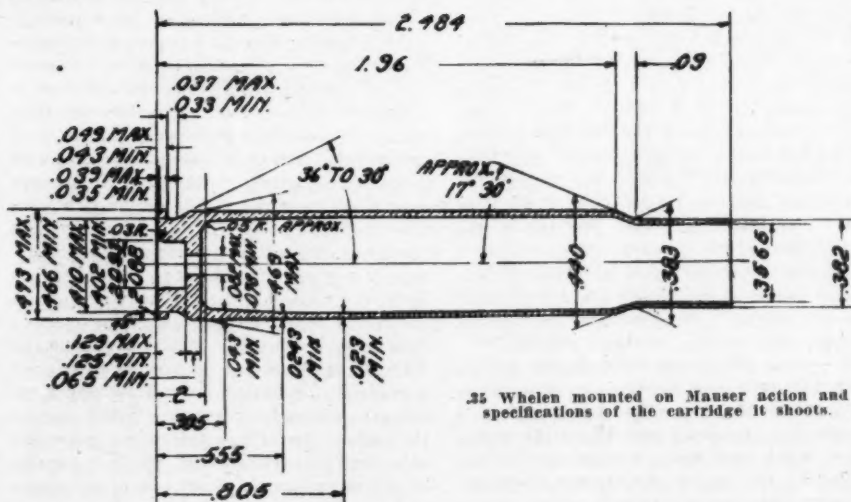
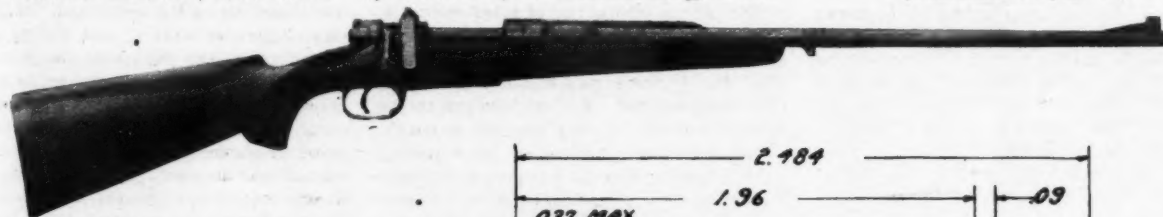
HAVING completed the .400 cartridge and its rifle we started on another cartridge for which there was a demand, and which seemed to have big possibilities. This was to be of .35 caliber on the same general lines as the .400 cartridge. It looked as though we could get quite high velocity with such a cartridge, and this combined with good accuracy should prove very useful, permitting the sportsman, in the open country of the West to command his game at a much longer range than with our existing weapons. While with a good .30 caliber rifle a trained rifleman can make pretty sure shots up to 350 yards, at that range the small bullet has lost much of its killing power. But a 250-grain bullet of .35 caliber, started off at

There are other cartridges of .35 caliber or 9 mm. which have more power, but everyone of them are lacking in one or more important items—they are not particularly accurate, they use erosive or corrosive powders, or powders very sensitive to change in temperature, they give metal fouling, the empty cartridges stick when it comes to extraction, etc. The following table shows the results we obtained in our ballistic tests, using both the 250-grain open point bullet above referred to, and also the 200-grain soft point, gilding metal packed bullet of the .35 Remington-Auto.

As a result we standardized on the load for the 200-grain bullet at 60 grains of Du Pont I. M. R. Powder No. 6, giving a muzzle velocity of 2834 f. s., and a muzzle energy of 3570

ft. lbs. The height of the 200-yard trajectory at 100 yards is 2.5 inches. For the 250-grain bullet we standardized on the charge of 62 grains of Du Pont I. M. R. No. 15 giving a muzzle velocity of 2635 f. s., a muzzle energy of 3855 ft. lbs., and a 200-yard trajectory height of 3.0 inches at 100 yards. In accuracy tests at 100 yards with these two cartridges we obtained an average group diameter of 2.35 inches for the 200-grain bullet, and 1.90 inches for the 250-grain bullet. We encountered no metal fouling or any other troubles whatever. The recoil is not unpleasant, even in rifles weighing as low as 8½ pounds. We found in fact that it was possible to take a worn Springfield barrel for the .30-06 car.

(Concluded on page 23)



.35 Whelen mounted on Mauser action and specifications of the cartridge it shoots.

a high velocity should have good killing power on our largest game up to almost 500 yards. In fact, several years ago a friend had a Springfield rifle made at considerable expense to handle a .35 caliber cartridge, and although he only got about 2400 f. s. muzzle velocity from it, he used it on a number of trips to the North on Alaskan bear and moose with excellent results. Its killing power was most remarkable.

We started out in much the same way as we did with the .400 cartridge, taking all those precautions necessary to assure a powerful, accurate, safe, and dependable cartridge. At first we planned to use the 250-grain gilding metal jacketed bullet of the .35 W. C. F. cartridge, but after we got well under way we found that we could obtain a better 250-grain bullet with a spitzer open point which would be more satisfactory in many ways particularly in having less air resistance and thus giving a flatter trajectory over long ranges, so we switched to it. When we had our experimental cartridge components, and our pressure and accuracy guns made we were delighted to find that we could attain far higher velocity and much better accuracy than we expected.

While the .35 Whelen cartridge is not a world beater in any single respect, yet when it comes to that most to be desired combination of killing power, accuracy, flat trajectory, and reliability, there is not another cartridge that can stand up against it for a minute.

TABLE OF EXPERIMENTAL CHARGES—.35 WHELEN RIFLE

Bullet grs. wt.	Powder Kind	Powder grs. wt.	M. V. f. s.	Remarks
200	Du Pont No. 17	55	2584	Large white flash.
200	" " No. 17	58	2667	Powder to base of bullet. No flash.
200	" " No. 17	60	2771	Slight compression. No flash.
200	" " No. 16	60	2834	Very satisfactory. Pressure normal.
250	" " No. 17	53	2351	
250	" " No. 17	55	2462	
250	" " No. 15	60	2575	
250	" " No. 15	62	2635	Very satisfactory. Pressure normal.

Every-Day Ballistics



Origin and History of Ballistics

By Major G. P. Wilhelm, Ord. Dept., U. S. Army.

Part II.

IT is very interesting to note that for hundreds of years there was a misconception of the purpose of the rifling. It was long held that the rifled gun gave the most range, even though the balls were round. Undoubtedly it was thought that a greater range was obtained because of the ease of hitting at greater distances and because it was impossible to use as large a charge, due to the resistance of the bullet and the greater pressures that would be involved. Of course the rifled gun with an elongated bullet will give a greater range as the bullet will otherwise tumble. With a round ball this is not true.

It was also commonly believed that the indentations made on the bullet by the rifling caused the bullet to rotate when passing through the air, by air pressure, like a windmill. It seems that a little thought should have convinced them that the bullet must have been forced to turn as it passed through the barrel and that this rotation must have been very rapid, particularly as compared to the slight effect of the air on its rifling marks.

It has already been stated that some thought the air had no resistance and yet others looked upon the air as if it were water and had resistance great enough to rotate a bullet.

Inventors to this day still submit designs with bullets having spiral grooves or holes through the bullet through which the air is supposed to pass and thus rotate the bullet. How foolish this idea is, considering the fact that the bullet must be rotated at several hundred thousand revolutions per minute. It has even been proposed that the bullet be made to rotate and yet be fired from a smooth bore, with all its advantages of cleaning, etc., by rotating the barrel. Imagine rotating a barrel several hundred thousand times per minute in order to achieve this simple effect.

Rifling exerted an immense effect upon the improvement of fire arms. For instance, it is said that the ratio of accuracy of rifled guns to smooth-bore guns is about sixty to one.

Inventions and inventors are peculiar any way. Science has not always been the most successful in achieving new inventions. The man who discovered, or who is given the credit of discovering gunpowder was a monk named Schwartz. At about the same time a

soldier invented printing. During the middle ages new ideas were not always welcome. Roger Bacon was afraid to tell all he knew and Galileo often had to take back some of his published statements and results of his experiments when they came in contact with accepted opinion. King Charles of England used to consider it one of his pet jokes that at one of the famous institutions of learning in England the aged professors sat around and spent all their time weighing air and doing nothing else. But if these men had not spent their time weighing air many of our present-day inventions could not have been developed.

Several hundred years ago it was a question whether guns would not be operated by steam and engines by gunpowder. As a matter of fact, all guns are engines and perform work in a similar manner. For this reason the early history of steam and gunpowder engines is so intermingled that their historical development cannot be separated. In the days of this same King Charles, in the middle of the 17th Century, gunpowder was a rival of steam, and patents were granted to a company for the design of engines which were to operate pumps by power to be used in raising water out of mines, etc. These engines were to be operated by a combination effect of air and gunpowder. The use of steam and gunpowder in engines was merely for the purpose of forming a vacuum so atmospheric pressure would operate the piston. To us now this seems inconceivable stupidity. Gunpowder, which is capable of exerting a force of 50,000 pounds per square inch would operate the piston. In a similar way, the first steam engine was operated. In fact, the story goes that in the 17th Century an inventor who claimed he had discovered the power of steam was considered such a nuisance on account of continuously bothering "the powers that be" that he was incarcerated. Later, a gentleman of questionable reputation overheard the man of genius raving about his invention and stole the idea from him.

So far we have covered only the history of ballistics up to the time when all knowledge which had been accumulated in the previous several thousand years had not yet decided upon any single important fact. The art of gunnery was still a dark and mysterious one.

Each man was his own ballisticians and concocted his own powder formula in the dark of the moon. All the elements of early gunnery depended upon a large number of variable factors. There were no tables of fire. The path described by the projectile was unknown, and since the projectile itself was often made of stone, the range for each gun and projectile fired depended upon such items as the age, degree of rusting and flaking and the variations in the design of the gun, not to mention the character of the projectile. The guns were all hand-made and the bores were rarely parallel. They were full of cracks and flaws, and if the projectile did not stick in the breech end it would in the muzzle. It was rarely possible to seat the ball where it belonged, next to the powder. Often a gap was left, thereby causing the gun to burst.

The customary efficiency of the early powders was away ahead of the metallurgy used in the construction of the gun. It was easy to make powder which could be counted upon to consistently burst the guns. The character of the weapons and arms was such that not much of a scientific study could be made. The hurling of stone projectiles with powder charges could hardly be called scientific.

The siege of Constantinople in 1453 was the ballisticians' nightmare. The number of different types of weapons compared favorably with the weapons of a modern army of today in complication. During this siege there was undoubtedly used the largest collection of ancient and medieval engines of war that had ever been gathered together on one field. There were catapults and cannon, bullets and battering rams, gunpowder and Greek fire. The largest artillery which has ever been constructed was used there. Some of the guns had a bore of four feet, which is just exactly three times the bore of our 16-inch rifles, which are the largest guns we now have. These weapons threw stones weighing nearly half a ton and at distances of as great as half a mile or more. As the majority of these guns were cast on the field of battle with the materials at hand, it can be seen that this was some ballistics problem. The guns were cast on their faces and the metal left at the breech end was cut off with an ax while it was warm. Some of these old weapons were used against

a British squadron during the Napoleonic war and British ships passing through the Dardanelles were repeatedly struck by high stones.

The guns, particularly heavy ordnance, followed two lines of development. First, guns shaped like a pot, or vase, having a narrow neck used for throwing huge winged iron arrows, and second, large guns of big caliber for hurling huge stones. The former, of course, was an imitation of the cross bow and the latter of the ancient ballista.

We now come to the first man who made an intelligent and systematic study of ballistics, a young Quaker by the name of Benjamin Robins, who constructed the first apparatus that had ever been evolved for the determination of velocity. This was the ballistic pendulum, which is still used somewhat at this day. Benjamin lived in England during the 18th Century and investigated every phase of interior and exterior ballistics. He not only determined the muzzle velocity and the remaining velocity of various projectiles at various ranges, including their striking energy, but also discovered and worked out to a surprising degree of accuracy the resistance of the air. He particularly noted the great increase in resistance of the air around the velocity of sound. He first explained the vacuum that formed in the rear of the base of a bullet traveling at high velocity and mentioned the boat tailed and the flat base bullet. Robins fired through paper screens and showed the actual trajectory and windage, including the effect of deforming the bullets. His work covered the entire field of ballistics, and he even went so far as to state that that nation which first rifled its guns would be most successful in war.

Although Robins read his epoch-making paper in 1746, rifled guns were not used on a large scale in war for over one hundred years thereafter, and although Robins correctly explained the phenomenon of drift, so ignorant were the men of his day and so successfully do men resist knowledge that over 75 years later a book on rifled guns stated that the curving of musket balls was due to some peculiar enchantment in the air.

In the struggle between ballistic science there has been a continual struggle between the gun and armor plate. It was early found that the old smooth-bore cannon with spherical shot of solid caliber could not penetrate iron. It was, however, many centuries before iron was considered superior to wood as protection, for when the thin iron plates were struck by the shot they were shattered and the fragments annihilated the crew inside. Later it was discovered that if the plates were made thick enough they were much superior to wood. The ballistic engineers then converted their cast-iron cannon and strengthened it in various ways, using chilled iron shot against thicker armor plates. When the plates were made still thicker it was necessary to use rifled guns of wrought iron or steel, with steel projectiles. The guns influenced the development of armor and armor influenced the development of guns. It being impossible to increase the power of guns, attention was

diverted to the powder, which was made slower burning and the guns being made longer. Larger grains of powder were used so as to be slower burning and to avoid sudden pressures. This, of course, required larger charges which, in turn, made it necessary to design larger chambers. In other words, it meant an entirely new design of gun. The new gun could not be muzzle loading, as it was too long and the powder chamber was larger than the bore. Therefore breech loaders were developed. We therefore have a struggle between guns and armor and muzzle loading and breech loading. Muzzle loading guns, in the beginning, could be made stronger on account of their solidity and simplicity, and were more valuable on account of ease and rapidity of loading.

In the design of heavy guns, the early ballisticians appeared to be a brainless bunch. Instead of the trunnions being level with the center line of bore of the gun they were placed at the bottom of the bore because it was believed by engineers that they could better support the great weight in this position. Also, it was found that it tended to throw the recoil on the trail in a downward direction. The effect, however, was to break the trails, even when made of the heaviest timbers. The trunnions were not raised for over three hundred years, although the advantage of using larger wheels without raising the guns was quite apparent. The use of trunnions on ordnance early came into being as they were used by the French artillery in the invasion of Italy in the late 15th Century. Incidentally, the French at this time introduced such revolutionary ideas as iron shot, heavy trunnions and standard calibers.

Of course, the history of the development of small arms and of cannon is coordinate. One always had its effect on the other. The first guns were cannon and the design of each type profits from the experience obtained with the other. Moreover, the dividing line between the two is very indistinct. For instance, at the present time we now have .50 cal. (1/2-inch) bore machine guns and 37 mm. (1 1/2") bore cannon and the caliber of the machine gun is increasing while that of the cannon is decreasing. In the South African War, the Boers peppered the British with the "Pom Pom," which was a large, overgrown Maxim machine gun capable of firing one pound shells. It was the characteristic noise of firing of these shells from which the name of the weapon was derived.

Similar guns were used in the World War by the Germans, and since the World War the tendency is to design cannon of as large caliber as is possible and the can still be made automatic.

The history of ballistics since the time of Robins is chiefly concerned with the efforts of various experimenters to determine the action of the powder gases on the projectile in the bore and the laws of air resistance to which the projectile is subjected during its flight through the air. As data was obtained on the former improvements were made in the

powder, the design of the gun and the projectile. This, of course, is distinctly a problem in Interior Ballistics. The determination of the laws of air resistance made it possible to so design the projectile as to reduce the retarding effect of the air to the minimum.

Robins was so versatile that he worked on both problems and included a little vertical firing for good measure. He exploded some powder in a closed vessel somewhat similarly to some of the ballistic experiments performed in the United States on the Fourth of July in the old days before prohibition and safety first and came to the remarkable conclusion that the explosion created hot air of about the temperature of a red hot stove poker, and that this air had a pushing or Jazz effect equal to about 1000 atmospheres, or in the language of *The American Rifleman*, 15,000 pounds.

Robins was followed in England by Hutton, who improved the ballistic pendulum for taking velocity so that it was no longer limited to musket balls but could also be used for balls weighing up to one pound. The outstanding results of Hutton's work was the raising of the ante on the temperature to twice as hot as red hot iron and the pressure to 30,000 pounds. This occurred about the time that George Washington was also working on certain British problems.

By the time of our return engagement with the British, ending with Andrew Jackson and The Battle of New Orleans, it had been alleged that the maximum pressures obtained with black powder of that vintage was about 150,000 pounds instead of one-tenth of that as estimated by Robins.

Following our Civil War, mechanical science had progressed to that point where it was possible for physicists to have suitable apparatus for measuring various kinds of data and naturally we find that great strides were about to be made in ballistic science.

Nobel and Abel introduced the use of crusher gauges on explosion vessels and established with considerable accuracy the laws governing the explosions of powder in confined spaces.

For instance, they found that powder gases increased in volume 280 times over the volume of the powder, with a weight, however, of only 43 hundredths, while the temperature was around 2200 degrees centigrade with a pressure of nearly 20,000 pounds per square inch. Incidentally this temperature is considerably in excess of that required to melt the stove poker already referred to.

Work on resistance of the air is almost entirely dependent on accurate measurement of velocities. The ballistic pendulum had to be superseded by devices capable of a far greater degree of accuracy and flexibility. The problem was attacked from various angles, including the principle of falling bodies or rotating discs. All involve the use of electricity, the first worth while outfit being that of Wheatstone in 1840. He suggested the use of wire screens carrying current which would have the circuit broken by the bullet and thus be recorded on a precision clock or chronometer. This grew into our present-day chronograph.

The next important steps were taken by a preacher, the Rev. Bashforth, who by means of an improved chronograph of his own design, worked out the laws of resistance which were used in England from shortly after the time of our Civil War down to some years after the Boer War.

In the meantime the Germans were also busy, and just about the time that Bashforth finished his work for England, Krupp performed certain experimental firings at Meppen, which served as the basis for the majority of ballistic tables compiled previous to the World War. From these Krupp firings in 1880, Mayeski determined the laws of air resistance, his work being extended at a later date. Colonel Ingalls, in the U. S. Army, converted the computations of Mayeski into our units. The first artillery tables arranged by Ingalls was based on the work of Bashforth. However, Bashforth's firing was entirely with old-fashioned spherical and round-nosed projectiles, so that Mayeski's work was the more lasting as he used short ogival projectiles, which were in vogue down to the World War and which were the harbinger of the latest long-pointed boat tailed shells. Mayeski formulae are no longer trustworthy except in rather narrow limits, and of course since Ingalls's tables are based on them they are also inadequate. For instance, Ingalls's tables do not take into consideration the base of the projectile when establishing the coefficient of form and the ballistic coefficient. As a consequence these tables when used at the longer ranges give too flat a trajectory and too long a range for the flat based bullets and too high a trajectory and too short a range for the boat-tailed type. An example is the large errors at long range in the previously published figures for the service bullet and the equally large errors in the opposite direction for a boat-tailed bullet of the National match type.

In closing the historical development of ballistics it is only necessary to refer to two more phases, i. e. present types of apparatus and an idea of the ranges obtained with modern musketry as compared with the older types.

For a great many years methods have been standardized for determining various ballistic data. For instance, pressures have been taken by means of copper crusher gauges composed of cylindrical coppers which are placed in a yoke on a gun barrel with plunger. The amount the copper is compressed is the measure of the pressure. Velocities for years have been taken with the Boulenge chronograph, which consists of two rods held by electro magnets in such a way that the current is broken, thus allowing the rods to fall by the passage of the bullet through two screens or wires at a certain distance apart. The drop of one rod during the interval of the passing of the bullet from one screen to the other is measured by a mark left by a trigger mechanism operated when the second rod falls, and it is this drop which is the measure for the average velocity of the bullet over the given distance.

During the war the Ordnance Department developed another type of apparatus which is much simpler than the Boulenge and is used

a great deal at Aberdeen Proving Ground for the determination of velocities, particularly small arms. It merely consists of a drum which rotates at a very constant velocity by means of an electric motor. The bullet in passing through lead foil screens makes a circuit instead of breaking one and causes an electric spark to jump on to a waxed sheet or strip of paper on the rotating drum. The linear distance between the spark marks on the paper gives the velocity of the bullet as the speed of rotation of the drum is known as well as its diameter.

The drop apparatus on the Boulenge is capable of an accuracy of about one four-hundred-thousandths of a second, although the accuracy of the final result is hardly $1/10,000$ seconds, due to a number of other factors. For the service rifle this means the determination of the muzzle velocity to somewhere around ten foot seconds. The Aberdeen chronograph on the other hand, while having about the same degree of precision, is much more convenient to use and can be set up anywhere without the use of concrete piers.

For big guns and where a very high degree of precision is required, especially over a very small interval of the projectile's flight, a special type of apparatus is used, called the Solenoid Chronograph, consisting of two wire coils through which the projectile is fired, having first been magnetized. This induces an electric current at each coil, and the time interval between currents is recorded on a moving film by means of an oscillating tuning fork which graduates the film into intervals of $5/100$ seconds, which in turn can be subdivided to almost any degree. This device will record time intervals of $1/1,000,000$ seconds and can be used to determine velocities to the nearest foot second.

The Proving Ground has a camera for high speed work which will take 1500 pictures a second. The usual movie is taken at the rate of 16 per second and the slow motion movie at never over ten times that. This high speed camera never stops the film as in the usual camera and is used for all kinds of high speed work, such as recoil of guns, etc. By the use of the electric spark photographs of bullets in flight have been taken in $1/1,000,000$ of a second.

Pressures in guns can now be measured much more accurately than by means of coppers. The Proving Ground has an electric type of apparatus for this work which not only records the maximum pressure very accurately but also gives a time record of the pressure so that a time pressure curve is obtained directly.

Other new types of apparatus at Aberdeen make it possible to secure data for rifles and machine guns in a much superior way. For instance, it is possible to fire a machine gun automatically at long range into a water impact area without paying very much attention to direction and yet obtain a complete record on a moving film by means of microphone recorders of the muzzle velocity of each shot, the time of flight of each shot, and the location of each shot in the burst with regard to both distance and direction—in short, to re-

produce on paper if necessary the entire machine gun pattern. This reads like a fairy tale, but is possible and is done without the bullet touching anything in its flight such as wires, screens or paper.

Machine gun patterns and rifle dispersion at long range are also obtained by means of observers in towers who plot the location of the shots as they splash in the water. This work is being improved by means of the camera obscura, a device which throws an image on the water and bullet splashes on to a table where it can be conveniently recorded.

An installation is being made on the small arms range at Aberdeen of microphones connected to the Aberdeen Chronograph in such a way that ten shots may be fired from the rifle at a range of, say, 600 yards for the purpose of obtaining a shot group and yet at the same time record the muzzle velocity of each shot, the velocity at any point including the time of flight and the remaining velocity. The bullet does not touch anything, the microphones being actuated by the bow wave in the air from the bullet itself. In fact, with this outfit it is possible to use a heavy pressure barrel in the Mann rest and shoot through very light paper screens and obtain on the same shots the following data:

Muzzle velocity, remaining velocity, time of flight, elevation, accuracy and dispersion, the trajectory, including the angle of fall and, of course, any ordinate. In other words, the bullet's flight is no longer a mystery, as it is not necessary to make a separate test for each phase of ballistics.

Thus it is that the modern ballisticians go about his task of improving the art of throwing and keeping the advance of musketry continuous and uninterrupted until science introduces a better method of killing at a distance than the mere hurling of heavy objects. This so-called art of throwing is an old, old science. Up until a bare 500 years ago it was the hurling of sticks in the form of arrows and stones from the sling that man killed his distant quarry. And so far had he developed this crude art that it took the ballisticians and his new weapon, the gun, 500 years before it was a superior weapon to that of its clumsy predecessor.

The hand gun first used in the 14th Century and all of its offspring, the matchlock, the arquebus, wheel lock, flint lock, the match flint lock, and the English percussion musket were inferior in effective range to the long bow. It was not until the American revolutionary rifle that the gun and gunnery finally became superior to older art of archery in range and effectiveness.

Progress at the present time is rapid, and in recent years we have seen the range of the rifle greatly increased with an even flatter trajectory and greater accuracy than previously thought possible. In fact, gunsmiths of 40 years ago thought that the rifle had about reached its ultimate development. It had not then, and it has not now, and the "prophet" does not live "in his own country" or in any other country who can imagine what the next few years will show in the ancient and honorable game of gunnery.

Hand-Gun History

By Roy C. McHenry
Part 4 - Breech Loaders

THE year 1856 marks what may be termed the second period in the development of the revolver. Up to that time, Colonel Colt, the "Equalizer," had had things pretty much his own way in the manufacture of repeating hand guns. The only revolver which promised to become a serious competitor, that manufactured by the Massachusetts Arms Company under Edwin Weston's patent, had been adjudicated to be an infringement of the Colt patents in 1851. Five years later, however, the Colonel's basic patents expired, and the three features (1) rotating the cylinder by the act of cocking so as to bring successive chambers in line with the barrel (2) locking the cylinder in the proper position during the moment of discharge and unlocking it by lifting the hammer in cocking, and (3) isolating each nipple and its cap from the others by means of partitions to prevent the communication of fire laterally, became common property, to be made use of by whoever chose to do so.

Immediately a host of concerns began to put out revolvers of varying design, all embodying features of the expired Colt patents. Remington & Sons and Eli Whitney both purchased the right to use Beals' patent, and manufactured strong, dependable revolvers which speedily became very popular. The Savage Revolving Fire Arms Company, of Middletown, Connecticut (not related in any way to the present Savage Arms Corporation) produced a revolver which cocked by means of one trigger and fired by another and cupped the cylinder chamber over the rear end of the barrel to bring about a tight connection. C. S. Pettingill went two steps further and developed a double action hammerless revolver, but of such complicated design and fragile construction that it was constantly getting out of order and consequently did not sell well. Over in England, John Adams and William Tranter started to manufacture double action hammer revolvers which were more successful. None of these firms, however, made any attempts to depart from the time honored cap-and-ball system.

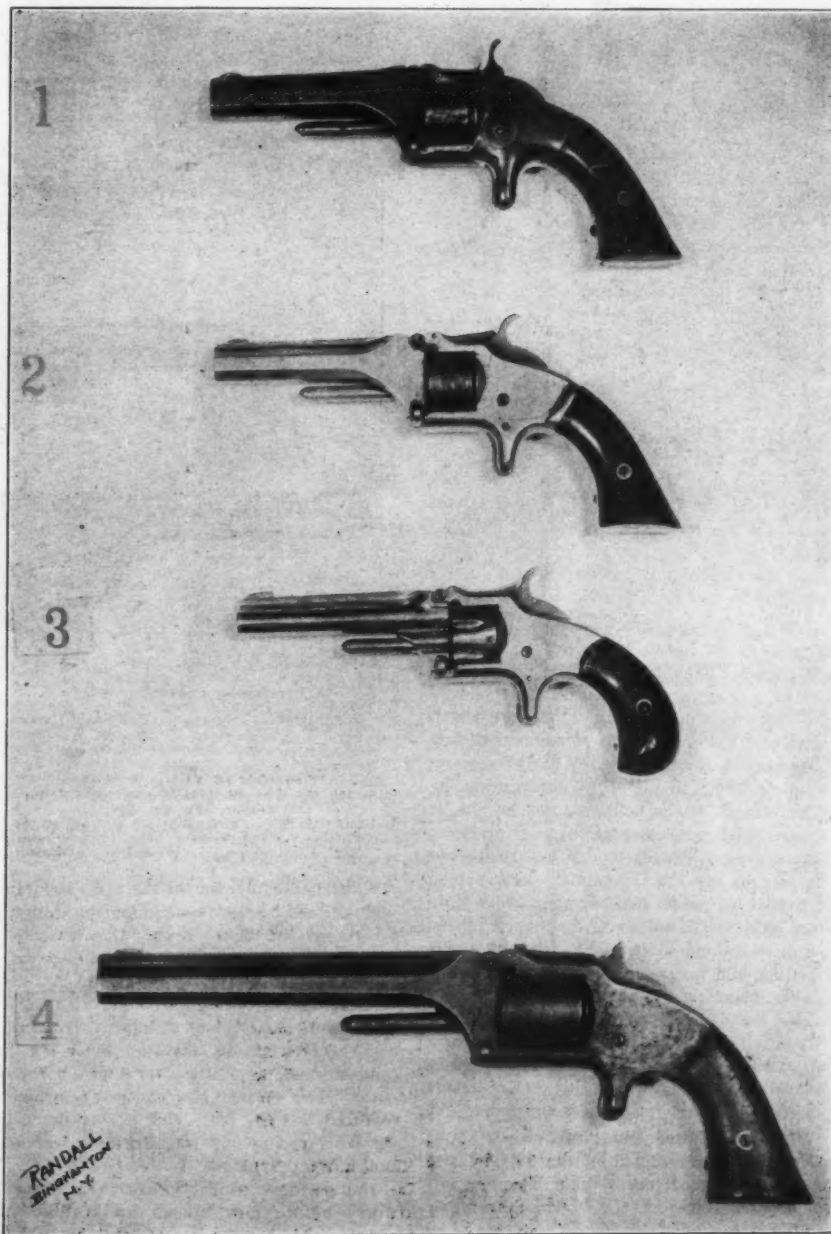
As early as 1835, a Frenchman named A. M. Potet had patented a center fire shotgun shell, with a brass base and pasteboard cylinder, and in 1851 another Frenchman, Flobert, had invented a bullet breech cap of copper, containing fulminate and a BB shot, which was much used in gallery rifles, but strange to say, up to this time no one had seen fit to apply either of these principles to revolvers.

In 1849, Lewis Jennings patented a unique type of repeating rifle. The cartridges were contained in a tube below and parallel with the barrel and were fed into the chamber by means of a ratchet operated by a ringed trig-

ger. The ammunition used was quite as original in design as the rifle. It consisted of a bullet, the rear portion of which was hollowed out to form a deep recess, which contained a powder charge. This charge was ignited by means of a Maynard tape primer. The rifle, which was manufactured by Robbins &

Lawrence, of Windsor, Vermont, was never produced in quantities, on account of the very short range and low velocity of the bullet.

Among the employes of Robbins & Lawrence was a skilled mechanic of an inventive turn of mind, named Tyler Henry. He improved upon the design of the Jennings rifle



1. Model 1, Smith & Wesson .22 Revolver, first cartridge revolver made. 2. Model 2, Smith & Wesson .22 Revolver. 3. Model 3, Smith & Wesson .22 Revolver. 4. Model 1 1/2, Smith & Wesson .22 Revolver.

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by substituting a lever instead of the ringed trigger to operate the magazine feed and added a peller or fulminate at the base of the hollow bullet, so that it could be fired by means of a plunger instead of depending on outside ignition. Thus improved, the rifle was taken over by the newly formed firm of Smith & Wesson, who made Mr. Henry the superintendent of their factory, in 1851. For about five years they manufactured repeating rifles and pistols according to Henry's improved design. There was no great demand for the rifles, because of their ballistic limitations, but the pistols were sold in considerable quantities, although they were never rivals to the Colt revolvers on account of the fact that it took both hands to operate them.

In 1855, anticipating the expiration of the Colt patents, Smith & Wesson decided to take a hand in the revolver industry and sold their patent rights and machinery for making repeating arms to the Volcanic Repeating Arms Company, of New Haven, of which the Winchester Repeating Arms Company was the ultimate successor. Mr. Henry went over to the new concern, overcome the difficulty with the ammunition and later developed the Henry and Winchester lever action rifles.

At about the time that Smith & Wesson were preparing to embark in the revolver line, or to be precise, on April 3, 1855, a young man named Rollin White obtained a patent for a revolver. He lived at Hartford, but the carefully kept roster of the Colt factory does not disclose that he ever worked there. Perhaps, if he had, his invention would have been more practical. It was a fearsome contraption, but the United States Patent Office, which concerns itself very little with the practicability of anything, held it to be a novelty in the development of fire arms and papers were duly issued to him.

According to the specifications, the cylinder was to be bored from end to end. In each chamber, behind the bullet, was to be inserted a charge of loose powder, backed by a wad with a pierced center, through which was to pass the fire from a percussion cap on the frame. A magazine below the barrel was to supply the cylinder with ammunition by the movement of the hammer, just how, it is not clear from a reading of the specifications.

There are no records to substantiate it, but it is safe to say that as soon as he received notice that his patent had been granted, young White paid a visit to his distinguished fellow townsman Colonel Colt, filled with high hopes of selling him his invention and revolutionizing the manufacture of revolvers. We can imagine the Colonel wading through the proximity of the specifications and see the frown that gathered upon his face as he visualized the exhibition of fireworks that would result upon the discharge of such a weapon.

"Why, Mr. White, your pistol would shoot backwards instead of out of the barrel. The flame would set off every other chamber and probably the magazine. The man who fired it would get his hand blown off and his eyes put out. It is too dangerous to think of even giving it a try-out."

Poor Rollin White recovered as best he could from the shock of witnessing the vivisection of his brain child, shook hands with the Colonel like a good sport and went home and stuffed his patent papers into a far corner of the family writing desk, after which he betook himself to his regular job, cured, temporarily, at least, of inventing.

And yet, Colonel Colt, although he did not live to fully realize it, had made a serious error of business judgment. If he had bought the patent, impractical though it was, he would have acquired another basic monopoly, the right to manufacture revolvers with cylinders bored clear through, which would have given his firm the whip hand over the only real competitor it ever encountered, for many years to come, and would have netted his corporation a return of many millions.

But to return to Smith & Wesson. Ever since the introduction of the Flobert breech-

right to manufacture the open ended cylinder, undoubtedly taking the same view that Colonel Colt had of the invention's other features.

A month or so afterward, the first Smith & Wesson "tip up" revolvers appeared upon the market. They had the same graceful outline and good balance as the repeating pistols the firm had previously manufactured, the same square grip and the frame was of the same material, bronze. The hammer was a peculiar affair, with the upper part hinged so that it opened like the mouth of an alligator, for the purpose of removing the pressure on the bolt stop, to permit the cylinder to revolve. For some reason the bolt stop was placed upon the top strap, instead of the lower strap of the frame, although the device does not operate as well as the one previously covered by the expired Colt patents. At that time, also, it was believed that cartridges, in order to be safe, should be enclosed as much as possible,



Courtesy of Smith & Wesson

1. Smith & Wesson Russian Army Model Revolver, .44 rim fire.
2. Smith & Wesson Repeating Pistol, about .32 caliber. Used hollow base bullets containing powder and fulminating composition.

- Afterwards manufactured by Volcanic Arms Company. Also made in larger sizes.
3. Smith & Wesson Navy Model Double Action Revolver, .44 center fire.
4. Smith & Wesson First Model Center Fire Revolver, .32 caliber, five shot.

cap, the junior member of the firm, Mr. Daniel Wesson, had been at work upon the design of a metallic cartridge. In 1854 they patented a center fire cartridge with inside lubrication and made up a weapon to handle it. Later he developed a rimfire cartridge, with outside lubrication, the original .22 short. To adapt it to a revolver was an easy step, but when they came to make application for a patent for the latter, their Washington attorney promptly reported that the feature of boring the cylinder from end to end was already covered by Rollin White's patent.

The partners probably had their share of worry before they hunted up Rollin White and learned that the patent was still his and that he was willing to dispose of it at a reasonable figure. They only purchased the

and therefore a circular shield was placed behind the cylinder, and arranged so as to revolve with it, with just enough intervening space between it and the cylinder, for the heads of the cartridges.

For eight years only one caliber was manufactured, the .22 short, but in spite of the puny cartridges, the new revolver was taken seriously as a weapon, witness the American Encyclopedia, edition of 1861:

"But for close encounters the small cartridge-loading pistols are the most recent and much the most efficient weapons. * * * A difficulty is encountered in increasing the size of the cartridge loading pistols of this character. As the charges are increased the thickness of the copper can must be proportionately increased, that the charge may not be

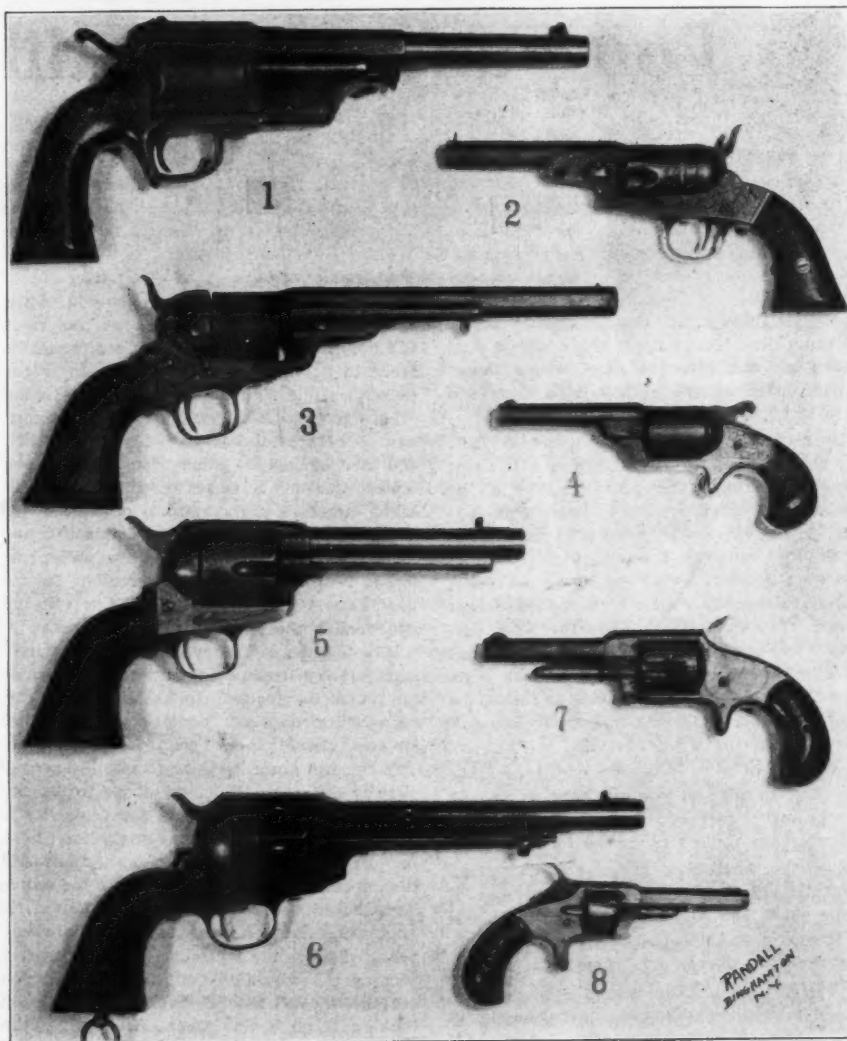
thrown back. But if this cap is made of very thick copper the percussion powder may not be ignited by the blow of the hammer, and the charge will not then be fired. It is for this reason that these pistols are yet of diminutive size only, but they are nevertheless surprisingly efficient for their size and some method will probably be devised of overcoming this obstacle to their capacity."

From the beginning the firm maintained the high standard of workmanship which has been one of its principal characteristics, the same smooth operation of the mechanism, the perfectly rifled barrels and the glasslike finish of the exterior. The little hand guns were found to be excellent for target shooting and the demand for them was so great that the factory was kept running at capacity from the start and turned out 10,000 a month.

The first model was manufactured from 1857 to 1868. It was too small to be classed in any way as a military arm, although many a soldier carried one in his pocket. No attempt was made to increase the caliber until 1865, when Model 1½ was introduced. This had more of the qualities of a real man's gun than its predecessor. It had a six-inch barrel and weighed about two-thirds as much as the Navy Colt, but it had a poorly designed hammer, which it was impossible to cock quickly and the weak and fragile hinge by which the barrel was attached, precluded its use of a club. Then again it used the .32 long rimfire cartridge, 13 grains of powder and a 90-grain bullet, which lacked the punch of the big percussion revolver charges, and for these reasons the West would have none of it. In the East it became very popular, particularly among police officers, and, I am sorry to say, among holdup men, bank robbers and burglars.

Until the close of the war, the Colt corporation had been too busy furnishing the Army and Navy with .44's and .36's, to say nothing of the revolving rifles and other arms it had been making, to worry about competition or to mourn over the bet it had passed up by neglecting to buy the Rollin White patent. The good Colonel had died in 1862, but his successors in the company were level headed business men who gave heed to the patent attorneys who advised them that they could do nothing toward developing a cartridge revolver, beyond experimenting, until the White patent had expired.

There were other arms concerns which did not show such good judgment. Daniel Moore, of Brooklyn, made a pseudo improvement by rifling the cylinder chambers for a short distance, and James Warner, Lucius Pond and a man named Lowell boldly started to sell revolvers with end to end bored cylinders. They were less conservative than Smith & Wesson and brought out weapons which shot .38 and .44 rimfire cartridges. Smith & Wesson promptly brought infringement suits against them which resulted in their being ordered by the court to turn over to the plaintiff their entire stocks and to pay heavy damages besides. Thereafter, for a number of years, they had to content themselves with manufacturing revolvers with only small apertures at the rear of the chambers, which shot the



1. Allen & Wheelock Revolver, .44 rim fire. The trigger guard operates the ejector.
2. Bacon Revolver, originally percussion, .31 caliber. Adapted to .32 rim fire cartridge. A gunsmith conversion.
3. Colt Navy Revolver, originally 1851 model percussion model .36 caliber, adapted to use .38 Long Colt center fire cartridges with expanding base bullets, the .38 being really smaller than the .36.

4. Moore "teat" cartridge Revolver, Williamson's patent, .30 caliber. Cartridges are ejected from front of cylinder.
5. Colt 1878 Peacemaker Revolver, .45 caliber, 5 1/4-inch barrel.
6. Remington Single Action Revolver, .44-40 center fire.
7. Whitneyville Revolver, .32 rim fire. The better grade of cheap revolvers.
8. Whitneyville Revolver, .32 caliber.

abominable "teat" cartridges, which loaded and ejected in front, and had the happy faculty of exploding prematurely if they were pushed in too hard.

Officially, the Colt continued as a percussion revolver until 1873, but sundry and divers gunsmiths about the country, who were less scrupulous about infringing patents, were kept busy converting the big revolvers which became so plentiful after the war, to shoot the Henry rifle cartridge, a rim fire, and a little later a center fire cartridge of the same caliber (.44). Any skilled workman could cut off the nipple part of the cylinder. Sometimes a steel disk of the same diameter was added, through which operated a set of six little firing pins, other gunsmiths cut holes in the disks to allow an elongated hammer to reach the cartridges, but the commonest alteration was to bore holes large enough to admit the

cartridges, braze or weld the disk to the cut-off cylinder and attach a ratchet so that it would revolve as before. For an ejector, a man carried a nail in his pocket.

In 1865, Smith & Wesson also adapted its Model 1½ tip-up to shoot a .32 center fire cartridge with a 9-grain powder charge, and thus improved, it was manufactured until 1892, nearly 100,000 being sold.

In 1870, Smith & Wesson secured the contract to supply the Russian army with revolvers. They brought out an entirely new model, the well-known break top type, with the first real ejector, a man size military revolver, of .44 caliber. The cartridges were at first rim fire, but as the outside lubricant was found to act badly in low temperature, a center fire one with inside lubricant was substituted for it, the now famous .44 Smith & Wesson Russian, beloved of all target shots.

Long and Short Rifle Scopes

By J. W. Fecker

WHEN shooting in competition in a large match, the difference between the winner and the loser is often measured by the attention to minute details. It has been said that genius is merely a capacity for patience and the shooter who overlooks no detail, however small, is usually the one who is always well in the lead. There are so many little things about scope and mounts which can make trouble, and where things can be made easier, that a few of them will be given.

In selecting your spotting scope, or rifle sight, the ranges at which you will shoot should determine the magnifications to be used. On long ranges 600 to 1200 yards, it is best to use the lower powers, as the mirage at the long ranges is too greatly magnified by the high powers. Don't expect to see bullet holes at 600 yards or over by using a 60-power scope. You can't do it unless the air is perfectly still and clear. Neither can you expect to keep in the bull at 1000 yards with a 16-power rifle sight, for after trying to follow the bull in its mad midsummer shimmy you will soon be dancing a jig yourself.

A power of 20 to 30 is plenty for long range spotting, as the best you can hope to do with the ordinary scope is to see the spotters. For a long range sight, 4 to 6 is also high enough.

For the small-bore range you can stand considerably higher power, as the range is quite short, and to spot .22s in the black you will need a magnification of 18 to 35, depending on light, mirage, etc. For sights 6 to 10 power will do nicely.

When shooting directly against the light, or with a strong light behind you, a sun shade on the objective and eye end is a big help. They can be made easily by using the black paper from a roll of films, and rolling it around the end of the scope and slipping a rubber band around it. This home-made sunshade you can slide backward or forward and get just the amount of shade desired.

In shooting in strong, glaring light, colored glasses are a great help. The dark amber or smoky green are the easiest on the eyes, and pieces of a broken lens can be waxed on the eye end of the scope to act as a ray screen. Screens of various colors can readily be made by taking an old undeveloped film, thoroughly fixing and washing it and dyeing it in aniline dyes. You can purchase three or four different shades of yellow, orange or green, and dye the film different densities and then have a ray screen for every light condition. By putting different screens together, one can often get a startling brilliancy to the target on a dull overcast day, when visibility would otherwise be bad.

Spectacles on the firing line are almost always a source of trouble. When you are comfortably settled in the prone position, your line of sight is obliquely through the upper

corner of the lens and the correction is entirely different as compared with looking squarely through the center of the lens. The distortion and change of astigmatic correction is particularly bad where the shooter requires a rather strong lens. I generally take one of my old lenses and stick it on the end of the scope with a mixture of beeswax and rosin and then the trouble is gone. Care should be taken to get the two holes in the lens blank exactly in line with the horizontal cross wire, otherwise the axis will change where astigmatism is present and your eye will soon tire, and then one or the other wire will fade out.

Keep the outside lenses of your scope clean at all times, a slight coating of dust or an oily surface will decrease the illumination and definition to a surprising degree. Wipe the lenses with a clean, old handkerchief. Do not use chamois skin as it is full of fine grit and will scratch the high polish of the lenses.

If you want to give yourself a fine handicap, just try to shoot with a scope which is not correctly focused for YOUR EYE; yes, focused for your own personal eye. Another shooter cannot focus your scope for you. The chances are a hundred to one his eyes is slightly different. Point the scope to the sky and focus the eyepiece until the crosswire is clearly seen and as black as possible. Check this by closing the eye a few seconds and then opening it and looking through the scope. You should see the crosswires *instantly*. If you must look a second or two before you see the wire, the eyepiece is not properly focused. Change the focus slightly until you see the wire clear and black instantly when looking through the scope. Then place the scope on a box or other solid support and focus the objective or inverting lens until the target shows no parallax at the range at which you are going to shoot. When there is no parallax your scope is correctly focused, and only then.

One of the bugbears of the scope game has always been the mounts. They should be thoroughly gone over before a match. Through prolonged use in one position the windage and elevation screws soon get a groove worn in the end where the scope slides back and forth. The screws should be taken out and the ends lapped square with a fine oil stone, until all grooves are polished out. Do the same with the spring plunger, making sure that all dirt and grit are removed and new, clean oil worked into it. It is well to take out the spring and stretch it to insure ample spring pressure.

The fit of the scope in the front mount is very important. The scope should bear only on three points, the lower point of contact being the spring or spring plunger, and the two upper points of bearing being in the upper position of the mount. The three points of contact should be approximately equally spaced. If the bluing is wearing off your

scope in a broad band on the upper surface, take off your front mount and file out the upper portion so that the scope bears in two points only. If the scope bears on the top and bottom only, it can rock sidewise and will cause your shots to string out laterally.

If you are using a 5A Winchester scope, examine the plunger carefully for fit in the groove and front mount. The top of the plunger should be stoned off until the plunger bears in the sides of the groove only. Take hold of the scope and try to rotate it and see if the plunger is loose in the front mount. If it is loose, a new oversize plunger should be fitted. Press the tube down and allow it to come back to test the spring for correct tension, and be sure the plunger is well oiled and does not stick.

The dovetail in both front and rear mounts should be lapped out with a fine three-cornered oil stone to smooth down the surface, and remove all burrs where the clamp screw comes through. It is well to file out the center of the dovetail out so that the mount bears on the two sides only.

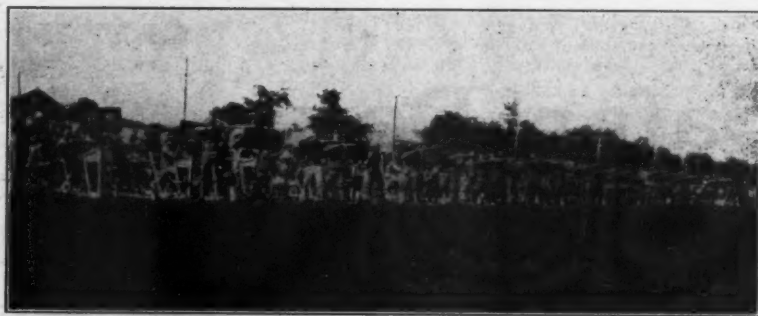
When you want to change the windage or elevation by one-half or one point, don't turn the screw one-half division and expect the scope to move, it probably won't. Turn the screw back about a whole turn and then bring it forward to the division you desire to set to. You will then be certain that the scope has responded. It is well to keep the scope well oiled where it fits in the mounts. If the tube is dry and you bump it slightly, it may move in the mount and not return to its original position, and you will never know it until you fire your next shot and get an off shot. The jar of firing the gun will probably jar the scope back, and hide the trouble, whereas the oiled tube will not stick. To be safe it helps always to lightly press the scope against the adjusting screws before each shot.

The dovetail blocks are another source of trouble. All sharp corners and edges should be bevelled, so that there is no chance of a burr. With a sharp edge a bump will raise a slight burr which soon wears down and you will get a different zero point every time you take the scope off. The mount should be relieved in the middle, so that it bears only on the two sides. Be sure everything is perfectly clean before putting the scope on the gun. It takes only one grain of sand in the mount block to throw you off considerably at long range. Where mounts and blocks are carefully gone over and kept in good shape, you can take your scope off and put it on and not lose your zero point.

It is conceded that these are simple helps indeed. They are set forth for the benefit of those who just haven't thought about them before, and who may be glad to apply them. Anything and everything to make better shooting easier for all hands

The Start At Perry

By Stephen Trask



IF National Matches of the future are to equal or surpass the number of competitors registered for the competitions of 1923 the Camp Perry Range must be re-arranged and enlarged or a new National Match Range with firing line and tentage accommodations one hundred per cent greater than any existing range must be provided.

This truth is all too apparent to the Executive Staff of the current competitions who, since September 1, have been trying to solve the problem of taking care of more than 3,000 rifle, pistol and shotgun enthusiasts who throng a range where no more than 2,000 were expected. Even the requisitioning of additional supplies and the assignment of additional personnel has not entirely eliminated the difficulties nor has a very material change in the layout of the range itself done more than prevent a hopeless congestion.

When the 1,000 shooters who elected to attend the Small Arms Firing School forerunning the actual competitions arrived in Camp the first day of the match period they found a very different firing line from the old familiar stretch of benches along the Lake Erie shore. The 200-yard range at the right of the line remained unchanged but between it and the 600-yard line there had been constructed a new and novel type of small-bore range, centrally located, easily accessible, and calculated to attract those who in the past have rebelled at the long hike to the old .22 caliber shooting sheds a mile down the line in the old apple orchard. The 800, 900 and 1,000-yard firing lines were not disturbed, but the old apple orchard at the extreme left of the line was chosen as the location for the International 300-meter shooting, and there were constructed 22 target cloth and scantling shooting booths facing a new line of concrete butts. This location proved entirely adequate for those trying out for the International Team since all the candidates are concentrating at this one range. The Trap-shooting field, under the direction of Col. John Caswell, occupied its usual location near the entrance to camp.

Two of the most radical changes made in the Camp layout affected Commercial Row and the Statistical Office. Representatives of the various arms companies this year are housed a long line of roomy frame houses with sleeping quarters included running at right angles to the main road. The statistical office, formerly located at the intersection of the two main roads of the camp was moved

to a large frame building back in the camp area.

With these changes and improvements affected it appeared that the National Matches of 1923 would present no particular difficulties which impression persisted until the arrival of 17 Civilian Teams who came at their own expense, 18 R. O. T. C. Teams, 8 C. M. T. C. Teams, 44 National Guard Teams—the greatest number in the history of the matches—and the Army, Navy and Marine Corps squads, not to mention some 200 unattached competitors.

Consequent of this influx of shooters, additional canvas was pitched wherever space could be found, and the Quartermaster depot, by recalling supplies previous regarded as surplus and issued to troops, all contestants were cared for.

During the first week of the Match period a large number of the competitors, except the service teams, joined up for the school of instruction many of the sessions of which were held in a driving rain. As the result of this course of instruction, which was given under the direction of Lieut. Col. Smith W. Brookhart and Maj. Frank Maloney, 1,000 student rifle were graduated as qualified instructors in marksmanship.

While the rank and file of the competitors were undergoing the course of instruction the Small-Bore Range, the International Match Range and the Shotgun field were opened for the benefit of those with a predilection for these particular classes of shooting.

The Small-Bore Range, under the direction of Capt. G. L. Wotkyns, became almost immediately the center of very marked activity. In its new location, practically in the center of the main firing line the .22 caliber layout was a demonstration of something new in short distance range operation. Borrowing the principle upon which the 1,000-inch machine gun ranges are operated, the targets, tacked to wooden frames were mounted on wheeled trucks which run on narrow-gauge rails, and which are sent out to the required distances and returned to the firing points by means of a rope running through a sheave, on the same principle that indoor gallery target carriers are operated.

The list of entrants from the small-bore ranks for the DeWar Match tryout indicate that there will be no dearth of good material when the time comes to pick the shooters to defend America's title to the small-bore championship of the world. In addition, there have

never been a greater number of individuals in the National Small-Bore matches, and to date there has been a greater number of .22 caliber cartridges burned in practice and re-entry shooting than during entire previous shooting seasons at Camp Perry.

Around the Small-Bore firing line it is noticeable that the bulk of the shooters have abandoned iron sights, and that telescopes are the order of the day. This situation gave rise early in the shooting to a most disturbing circumstance which not only necessitated a radical change in the handling of the targets on the 50-yard range, but may also have further effects on the 100-yard shooting.

By the time the shooting on the small-bore range got well under way, the scorers were confronted by numbers of 50-yard targets on which were printed groups of such closeness as to making scoring extremely difficult and in some cases impossible, there being no way to check up upon the number of shot holes through the target. Under these conditions the V-ring which was introduced in small-bore shooting last year was of no avail. It was therefore decided that each 10-shot 50-yard string must be fired on two targets instead of on one. After this had been tried out for a day several groups were discovered which defied separation, but in the main the remedy so far is proving efficacious, although naturally tending to slow up the shooting, since it is impossible to crowd a double number of targets on each carrier.

While at the beginning of the shooting on the small-bore range six of the narrow-gauge target trucks were in operation, it became necessary after the first three days to add six more tracks to the small-bore layout which to a great extent did away with the congestion.

In addition to the squad of 45 American riflemen who are candidates for this year's United States International Team there have arrived at Camp Perry M. Andrew Ragaud, representing the French Rifle Association; Edouard von Brech, representing Holland, and James Boa, representing Canada. These are the first of the foreign delegates to reach the matches.

While no other foreign riflemen have as yet appeared, Maj. L. W. T. Waller, the Captain of the United States International Team, is progressing with the selection of his team. Trial shooting on the International range has been held daily, as the result of which the

(Concluded on page 18)

Safari Days

By W. J. Morden

Hunting Rhino and Buffalo in Kenya Colony



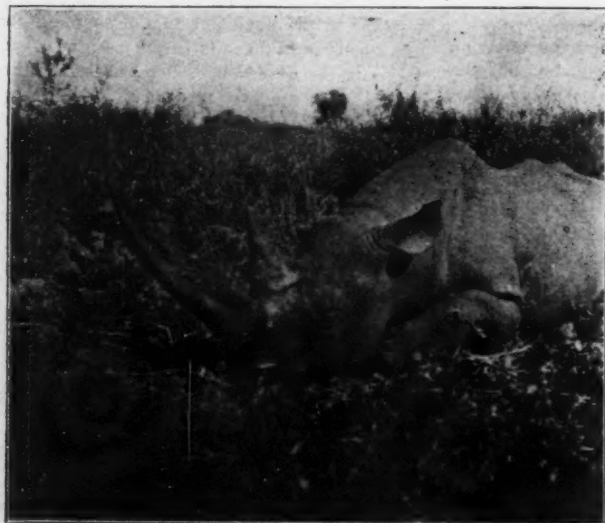
O PINIONS differ regarding which of the big game in Africa is the most dangerous. Some experienced hunters will tell you that lion is the game to respect, others say elephant, while there are those who have had their most exciting moments with rhinos. All agree, however, that buffalo are exceedingly likely to give trouble and are to be hunted with caution. Buffalo are far more apt to charge unprovoked than are any of the others and cannot be turned aside by rifle fire so easily. Also, a buffalo is very hard to kill, especially when he is coming towards one, as his head is protected by a heavy mass of horn, making a vital shot most difficult to place. In addition to this, his sense of smell and hearing is very acute, and his hearing good. And in spite of his bulk, he is amazingly quick.

The buffalo is the most vindictive of any of the big game, and when wounded has been known to circle back on his trail and patiently stalk his pursuer. If he gets his victim down he will stamp on him until but little remains to tell the tale. One's chances for safety are

fair in the open, but it is considered most foolhardy to follow buffalo into high grass or bush, and to go after a wounded buff in such country is suicidal. The chances are all with the buff. A well-known hunter, who has lived in East Africa for many years, told me that buffalo was the only game which he really thoroughly feared. He had had some close shaves with lion, leopard, and elephant, and had once been charged simultaneously by two rhinos. But on each of these occasions he had felt that his chances were at least even. Twice, however, he had had wounded buffalo stalk him in thick bush, and each time he felt that his escape was little short of a miracle. On one of these occasions a badly wounded buff, which he was following down a lane in thick cover, turned round, circled, and charged him from behind. His gun-bearer saw the beast first, and called out as he dashed aside. The hunter wheeled and raised his heavy gun at the same time. There was no time to aim, but both bullets fortunately went into the buffalo, though with no apparent

effect. The next thing the hunter knew he was on his back underenath the animal, with his head between its forelegs. Believing it was all over with him, the hunter nevertheless instinctively drew his knees up to protect his abdomen, and somehow managed to roll clear, jump to his feet, and make a head-long dive into a wait-a-bit thorn bush. At that instant the gun-bearer dashed back upon the scene and with only a light rike, succeeded in finishing off the already badly wounded animal. Examination proved beyond a doubt that the buffalo had been dying when it charged the hunter, but with the peculiar endurance of these formidable beasts, it gave battle to the very end.

In appearance buffalos are not particularly impressive. They look at a distance not unlike big, black cattle, and their heavy horns and big ears give them a rather stupid expression. One morning we sighted a herd of buffalo on a distant hill, and though the wind was uncertain and not in our favor, we decided to attempt a stalk. It was a difficult stalk, as there was little cover, but by crawling carefully for some distance behind scattered boulders and patches of grass, we managed to get to within about ninety yards of the herd. We had just arrived and were settling into position when a swirl of wind carried our scent to them. Instantly the herd was in motion, their heavy tread shaking the earth. A snap shot of a big bull was all that offered, and I took it hurrldiedly, but so far as we could see it was without effect. The herd dashed downhill and into some tall grass at the bottom. We watched until they came out at the far side, and then followed. So far as we could tell, the whole herd had crossed the hollow, but after we had passed—rather apprehensively I must confess—through the tall grass which towered far above our heads, we were startled by a sudden rush behind us. We were a bit uphill at the time, and looking down, could see the black back and horns of a buffalo. He had evidently been quietly waiting in the deep grass and would have been "bad medicine" to meet.





Left—Black Rhino shot by Mrs. Morden.

Below—Buffalo and rhino shot by author. Rhino has 26-inch horn which is very good.

Title illustration shows camp made in Southern Masai Reserve, Kenya Colony.

Fortunately we crossed a bit above him, and he did not come out in our direction.

One evening, returning to camp, we spotted a lone bull at the edge of some bush across a little gully. I fired a quick shot and missed him. Like a flash he plunged into the gully, coming straight towards us. I held back my second shot, as there would be no time to reload, and it looked as though a second shot might be needed for emergency. Apparently, however, he was not coming for us, or had not located us correctly, for he passed us a few yards to the right and dashed off with a great crackling of twigs and branches. I was sorry then that I had not chanced a second shot. We had no closer calls with buffalo during our hunting, and killed our specimens without any particular danger. In the case of mine, it was so simple as to be funny. We located a lone bull in the open and stalked him under cover of an ant-hill. One shot from my .470 broke his back. A brief story:

The Memsahib shot hers out of a herd at the end of a long day's work. We sighted them in the early morning, but by the time we got close, they had lain up for the heat of the day in a dense thicket. Posting a boy to watch the place from a distance, we retired a few hundred yards to the shade of some trees, and stayed there for some four or five hours. Late in the afternoon the boy returned to report that the herd was showing signs of restlessness, so we set out in their direction. They were feeding on the far side of some bushes and were making for the shoulder of a small hill. Crossing the valley, we toiled after them, only to find that again they had gone into shade and were feeding in the forest. Picking a path that lead well above them, we made the top of a hill which looked down on where they were, and settled down to await events. Action came with a rush. There was the sudden thunder of hoofs as the herd came pounding out of the forest. Their path lay about a hundred yards below us and they were going strong. It made it difficult to pick a head, for they bunched as they ran. Fortunately, however, a very fair bull fell to the

Memsahib's first shot, and we made camp late that night with much rejoicing.

Rhino we shot a little farther north, in the Tana River district. These, of course, were the common or hooked lipped variety. They are not particularly dangerous, except when encountered in thick brush. Their sense of smell is very acute and their hearing is good. Their sight, however, is very poor, and they are considered rather stupid animals. Sometimes a rhino will go berserk for no apparent reason. They have been known to charge through a safari on the march, dashing out of the brush when least expected and causing great confusion. The natives, however, do not greatly fear them. They say a rhino does not know beforehand what he is going to do but acts entirely on impulse.

We got both our rhinos the same morning. While looking for buffalo we came quite suddenly on one, not half an hour from camp. It was wallowing comfortably in a mudhole. Through the glasses we could see that, while

not extraordinary, he was a good specimen. The actual stalk was simple. Each time he rolled on his back we ran a few yards forward, until at a distance of about thirty yards the Memsahib put him out with a solid bullet from her .470 double rifle. His front horn measured eighteen inches.

We sent a runner back to camp for skinners, and continued on our way. Very shortly a dark object on a hilltop caught our eye. It proved to be another rhino, moving slowly through some long grass. Even at a distance his front horn showed up to be unusually large. We hurried down the hill, crossed a valley, and cautiously climbed to where we had last seen the rhino. We pointed around for awhile, but could not locate him, the high grass making it impossible to see any distance. A gun-bearer was sent up a tree to scan the country. Suddenly there was a snort close at hand and the rhino jumped up from where he had been lying, not more than twenty yards from where we were. He stood puffing and snorting, looking our way, his long front horn rising above the grass as he raised his head. Aiming as closely as I could guess for a chest shot, I fired my heavy gun. He went down, but kept thrashing around in the grass. Now his head would show, and then his feet, as he rolled and knicked convulsively. We ran around to the side for a clearer sight, and a few more shots finished him. The horns were beauties, the front measuring twenty-six inches, which is unusually long.

Now that both Mrs. M—— and I had shot our rhino and buffalo, we did not linger in the Tana River district. It is a good game country, and we incidentally picked up waterbuck, bushbuck, and Coke's hartebeest, but it has a trying climate, and we were quite willing to push on.

The Northern Guaso Nyero lay to the north, and a short trip in that direction netted us Grevy zebra, gerenuk, oryx, and Grant's gazelle (notata), closing our East Africa shoot with a very good representative bag.





The American Rifleman

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By

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"Out of the Mud"

MUD, the Black, oozy, Camp Perry variety of mud, will remain the prevailing impression of those who attend the School of Instruction at Camp Perry this year. Gum boots and slickers have been the uniform of the day. Morning after morning the squads have sloshed up to the firing point and started firing in a young gale and wound up in a downpour. To the eternal marvel of the regular officers assigned as instructors, they have insisted on going out every morning, and persisted in firing through whatever trials and tribulations "J: Pluvius" or "Old Man Boreas" could wish on them, and out of the mud at Perry has emerged the outstanding figure of the civilian rifleman who wants to "learn how" himself, and incidentally learn how to spread the gospel back home.

Nor does the term "civilian rifleman" refer only to the men who have gone to Perry without uniforms or details. It applies here to the National Guard, the C. M. T. C., the R. O. T. C., and the boys and girls of the W. J. R. C. Had the regular teams been in, they would, of course, have been there, too, in the mud. So to the organized and unorganized reserves must go the credit for raising above the mud the typical spirit of "The American Rifleman."

Civilians, Too!

THIS year a civilian and a small-bore shot took the Spencer Match at Sea Girt, one of the oldest and most historic competitions with the rifle, fired at the difficult range of 1200 yards. Competing with this civilian were the best of the service shots from the Marine Corps and Infantry Teams. This match and many of the other splendid competitions which Sea Girt offers have in the past been won by civilians. All of which proves that the current impression that the Sea Girt Matches presents an opportunity only for skilled "pot hunters" is erroneous.

Sea Girt is the logical "tuning up" ground for riflemen in preparation for the National Matches. For a good many shooting seasons the service teams have realized this and have made good use of the opportunity so presented. On the other hand, although Sea Girt is one of the most accessible of ranges and lies adjacent to a territory in which there are numerous rifle clubs and individual shooters, civilians apparently have to a great extent either overlooked the Sea

Girt program or have been laboring under the misapprehension that they have no chance against the skilled shots who go to Sea Girt each year.

This impression is not only unfortunate, but should be eradicated as speedily as possible. It is true that the entry lists this year were more than eighty per cent service shots; it is also true that had not the Army and the Marine Corps teams established the custom of "tuning up" at Sea Girt the New Jersey State Matches would long ago have become mere tradition, and for their part in keeping the beautiful New Jersey State Range active, the service shooters deserve full credit.

Upon no range in the country—not even excepting the National Match range—are a finer series of competitions staged, and Sea Girt is the last strong hold of the ultra-long range shooting of earlier days in which men compete at distances of more than 1,000 yards. In no series of matches are there more splendid trophies, offered, or trophies about which more tradition has gathered. Such individual matches as the Nevada, the Swiss, the Rogers, the Roe, and the Libbey have made shooting history, and the man who wins one of these matches may well pride himself upon no mean achievement. And, in addition, it has become the custom to shoot each year at Sea Girt competitions paralleling the National Individual and National Team Matches which are later to be held in connection with the National Matches. Under these conditions it would be difficult to find a more interesting or instructive program than that presented at Sea Girt. The rifleman who either for financial reasons or a lack of opportunity cannot be at the National Matches can find in the Sea Girt Matches an excellent substitute; the rifleman who is going to the National Matches can find no better opportunity for practice which will stand him in good stead than that offered in the New Jersey competitions.

It is true that the New Jersey State program, from the standpoint of the present-day rifleman, could be improved by a revision of some of the conditions, but even as the matches stand they are well worth while, and when civilian shooters realize this and give these matches their wholehearted support, the New Jersey State Rifle Association will undoubtedly accede to requests for any reasonable changes which will make the program better meet the needs of the present-day service and small-bore rifleman.

The Shooters' Magazine

EDITORS

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New Blood At Perry

PERRY this year is fulfilling its mission as a producer of missionaries for the gospel of straight shooting as it has never before accomplished the task. Two hundred civilians who think enough of the game to pay their own expenses are on hand. Approximately half a hundred police officers will attend the School of Instruction or face the targets during the progress of the matches. Thirty-five youngsters, members of the W. J. R. C. and the future shooters and mothers of shooters, have put in a week of training and practice which culminated in a series of scores shot in open competition that were eye-openers to the "it-can't-be-done" squad. Sixty-two college and university men have taken the school and will participate in the matches as members of the nine corps area R. O. T. C. units. One hundred and twenty-five civilians, candidates for officers' commissions, as members of the C. M. T. C. team from each corps area, complete the list of civilian representation, a list that for fruitful potentialities has not been equalled in the history of Perry.

From the standpoint of the armed forces, the announcement that there are forty-four National Guard teams on hand is of the utmost importance. Every one of these forty-four teams is leavened with fifty per cent new men, who have never before breathed the shooting atmosphere or carried away the inoculation of shooting fever that emanates from Perry.

Camp Perry will send back to their communities and local organizations this year between six hundred and seven hundred men who have learned how to shoot, how to instruct others to shoot, and that the shooting game is worth while from the competitors' standpoint.

Boy Scouts and Rifle Ranges.

AFTER a good many years of ragged range operation by a motley collection of youngsters picked up here and there wherever opportunity offered, the Sea Girt Range this year was manned largely by a troop of Boy Scouts, with a consequent material improvement in the staging of the matches.

The custom of making use of Boy Scouts on the Sea Girt Range will undoubtedly continue. The boys should be encouraged to return next year not only because they contribute to the successful operation of the pits and the firing line but because they present a very fertile field for the development of riflemen.

No average mentally healthy boy can spend a shooting season in the pits of a big rifle range helping in the operation of the targets, or on the firing line scoring the accurate shooting of past masters of marksmanship without having awakened within him a keen desire to participate in the sport. Also in the pits or on the firing line he absorbs the groundwork necessary for an intelligent understanding of the principles of match shooting. After that the real grounding in the actual handling of firearms comes naturally.

The example set at Sea Girt should be followed on civilian club ranges throughout the country. Look up the members of your local Boy Scout troop and they will undoubtedly be found not only willing but eager to help out in any shoot, just to have a part in a contest of such strong appeal to American youth. Later they can profitably be interested in trying their hands at the game with the result that any club can by this method establish a source of supply for new blood as the boys mature.

THE WINNERS AT PERRY

Following are the winners of the various N. R. A. competitions received up to the time of going to press:

Members' Match

F. M. Franklins, Engineers, 50+10.

Rapid Fire Championship

Pvt. G. D. White, U. S. M. C., 99.

200 Rapid Fire

Lieut. Watson, Inf., 50—50—50.

300 Rapid Fire

J. B. Grier, Civ., Del., 50—48.

Leech Cup

Pvt. W. E. Hayes, Oregon, N. G., 105.

Navy Cup

Fireman L. C. Gordon, 94.

Infantry Match

U. S. Infantry.

Enlisted Men's Team

U. S. Marine Corps, 547.

C. M. T. C.

9th Corps Area, 523.

R. O. T. C.

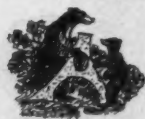
5th Corps Area, 520.

N. R. A. Free Rifle

Morris Fisher, U. S. M. C., 548.

The .250-3000 On Lion and Bear

By Allyn H. Tedmon



As I write the snow is falling fast and thick outside. By half closing my eyes in spirit I travel back up north. High on the mountain side I stand. The snow softly sifting down through the branches of the towering spruces, producing as it does a soft shifting rustle. In the snow at my feet is the track of a mountain lion. Up over the rim rock it goes and vanishes as it rounds a sharp point of rocks. This memory scene brings to mind a story told me by a hunter. Real hunters are so scarce nowadays that it is a treat to meet up with such a man. We have thousands of riflemen but due to the absence of game and the conditions under which most riflemen have to live, there are few hunters among them. The man I have in mind is John W. Crook, a hunter of the Biological Survey. A real hunter, as the most of these boys are, and a man who gets more actual experience than dozens of the average run put together.

One day Crook was out with a pack of hounds looking for lion. He jumped two from a deer they had killed and the hounds took off after them in good style. The lions, however, ran into some rough country, cut up with cliffs and a terrible place to get about. The hounds had to be lifted from one ledge to another. The lion was treed several times, but every time it would get away before Crook could get up. The other lion set off by itself, leaving one before the hounds. This was along in the afternoon. The lion went up the hill and at last was treed again. At about this time Crook came up, and as the lion jumped from the tree to a nearby cliff, he shot and hit it as it alighted and immediately as it turned he hit it again, killing it. Calling off the hounds, he hurried back to locate the other lion. As he hurried along he came face to face with the big cat as it was coming back to its mate, being followed by a toothless old hound of the pack. It immediately treed and Crook hit it in the backbone, the speedy little bullet tearing out about four inches of the big cat's ridge pole. Screaming terribly the lion jumped and started, dragging itself down the hill, where it died amid the blood-curdling growls and snarls of the hounds.

Crook has been using one of the little Savage 250's for sometime. In fact, he has had three or four of them. Of course, as might be expected, he has tried out a number of other rifles but has settled on the .250 as the one best suited to his use. At one time he was using a 30-30 Winchester carbine. I recall his telling of a shot he had at a bear with it. He had caught a grizzly in a trap and as usual it

had hiked out with both trap and clog. Crook trailed it down and came up to it at the foot of a big spruce, where it was tearing around and raising hob in particular. Crook wanted to get a picture of it, and thinking he would quiet it down, he shot it in the stern. However, the bear never even sat down, and so far as Crook could see, didn't feel the shot at all. As it refused to quiet down and was liable to start off again, Crook shot it back of the ear in the neck. Upon examination he found that the shot in the hind quarter penetrated only about four inches and the shot behind the ear in the neck, the bullet only went to the bone. Crook said this settled the 30-30 for him.

Like the most of his profession, Crook uses Lymn sights on his rifles. A tang peep and ivory bead front being standard for him. As a comparison to the foregoing bear story he told me another in which the Savage figured. The hounds had run a bear to bay in a "V" of fallen spruce. Crook came up to about twelve or fourteen paces and looked the scene over. The hounds were barking and jumping at the bear and at last one of them received a terrible blow from a powerful paw, and as it went rolling, Crook called all the hounds off. The bear now for the first time turned its attention to him. He had the Savage and this all happened soon after he had obtained his first .250, and he was not a little dubious as to what that little copper bullet might do or not do to a bear on the fight. However, while this was running through his mind the bear reared itself up and with its front paws on a fallen spruce, started to make signs that it wished to become better acquainted. Crook couldn't stand for this, so with his doubts as to what the new rifle might do, he took quick aim and fired, hitting the bear in the breast. To quote Crook, "the bear just dropped back and melted out of sight." After everything being quiet for a short time, Crook ventured around and there found bruin dead as a nit.

On examining this animal he found that the bullet had entered the chest, busted through the heart and had lodged in the backbone over the kidneys. The stock of the little rifle immediately went up so far as Crook was concerned, and it won a permanent place in his heart and hand.



These stories recall two other instances. In one of them a friend fired several shots from a Remington 35 Auto. into a big bear. A big one, I mean, not an average scrubby one, but one of the largest that has come out of the Yellowstone country. The bear didn't stop and the man behind the gun was a real hunter, too. However, something like a year after this same bear was shot in the head and killed and when they came to skin him and cut off the fat the men found one of the 35 bullets. There it lay imbedded in the fat and it had apparently never been further in. This bear had fat on him at least six inches thick from what the boys said and was a tough customer for he carried numerous other bullets that had failed to even "touch him." Now we all know that a Remington 35 is a real He gun, but apparently there are some real He bears, also. It happens that in this instance the bear was shot with a Savage 250, and fell as a steer hit with a hammer.

The other story I recall ran something like this. A guide was out with his "Dude hunter" after bear. They were walking side by side near the foot of a cut bank. All of a sudden the guide heard the bear coming. Turning toward the top of the bank, he hardly had time to throw up his rifle and fire as the beast came to view. The bullet hit the animal in the chest and just raked it from force to aft. As the "Dude hunter" was only armed with a Winchester 35 Auto-loading rifle, the guide was glad to note that the bear was dead when it hit the ground. This, also was a shot from another Savage 250.



In relating the foregoing stories I don't want anyone to imagine that I am trying to advocate a Savage 250 for a bear gun for the average man. I believe in guns to fit the work in hand. If the reader wished to have a Savage rifle and expected to do any elk or bear hunting he should by all means get one of the .300 Savages. But if the reader will only hunt medium game and nothing probably larger than deer or black bear, then he would make no mistake in getting a .250, or one of the Remington High Speed .25 Rimless or ditto .30-30's. It is a great mistake in my estimation for a man to go hunting undergunned as we might call it. Be sure you have plenty of gun. You probably are not a John Crook, so you must make up in smashing power what Crook carries in his head. Hunting is like anything else, it takes grey matter as well as grey powder to get results.

Handloading Ammunition

By
R. Mattern



CHAPTER XXIV.

QUANTITY HANDLOADING

MOST handloading is done by shooters who make shooting a hobby without systematically following a course of fire to afford them pleasure or to develop their skill. Their loading of ammunition is a labor of love, not to be shortened without loss. They welcome long evenings and holidays spent in handling cases and bullets, one or two dozen at a time, through various operations and tools. The number of cartridges they produce is naturally limited, but is enough to satisfy their shooting requirements.

There is another class of shooters, however, whose needs are more extended and more complicated. They are folks who are not satisfied with such a comparatively few cartridges—and who want to spend most of their available time in shooting rather than in loading. They are keenly interested in details of their ammunition, often require special charges, and want to make a dollar go as far as is conveniently practicable.

An example of this class is the member of a club who realizes that to hold the interest of his fellow members a large supply of very accurate ammunition must be available at a low cost. Another shining example is the individual who takes a serious, permanent view of shooting; laying down for himself a schedule of daily or weekly firings. He wants to be able to shoot a hundred cartridges in an

hour without spending several hours preparing them. He can hardly load the hundreds or thousands of rounds in the ordinary slow manner. Cheap 22 rim fire shooting does not appeal to him as does the use of more powerful rifles. Unless the writer is badly mistaken a good many readers will agree that their pet ambition is much more extensive practice shooting with their larger rifles, without too much trouble and expense. The Government war ammunition is cheap of course, but reduced charges frequently are more to be desired. They are so much less disturbing on limited ranges.

To meet these foregoing requirements the person with more than a passing interest in shooting does well to equip himself with a more elaborate handloading outfit than any previously described in this series of articles. Such an outfit at a cost of no more than a hundred dollars in some instances and no more than two hundred dollars in other instances, will permit the handloading of a hundred cartridges in as little time and with as little effort as twenty-five can be loaded with ordinary small hand tools. More important, perhaps, the big bench tools will handle lots of five hundred or a thousand cartridges with reasonable and practicable effort. They also will do a better job in some particulars than small tools are capable of doing.

Experience shows that the human hand, after acquiring a little familiarity and deftness with an operation, will usually pass fifteen to twenty units a minute through it. If you pick up cartridges or pencils with one hand, pass them to the other and then lay them down again, you do it at about this rate if you pro-

ceed deliberately, as you would when performing the operation by the hour.

The full length resizing of cartridge cases is perhaps the heaviest and most complicated single operation in handloading. With a suitable arbor press on a bench, and with boxes arranged conveniently, one picks up and places an empty case in position, forces it into the die by moving a lever, withdraws it from the die with the reverse motion of the lever, then removes and drops it. Roughly, there are four separate motions. This operation can be performed easily at the rate of a hundred cases in eight minutes, which is nearly eight hundred an hour. When the work is speeded up a hundred cases can be put through in five minutes. One way of calculating the speed of work is to count the separate motions. In the above resizing of a case there are four, which therefore means fifty to eighty motions to the minute. Other operations can be gauged on this basis.

It is simpler to say that most operations are handled at the rate of about fifteen per minute. Now, there are seven such major operations in ordinary handloading of jacketed bullets—decapping, recapping, resizing, expanding necks, reaming, putting in powder, and seating bullets, with about another involved in inspection and gathering up the finished cartridge. Half a minute per cartridge, therefore, is about the total time called for in the complete operations.

In addition, when solid bullets are used, there is the casting, the putting on of gas check cups if they are used, the lubricating and sizing.

Several of these operations will proceed slower than fifteen units to the minute in ordinary hands, notably bullet casting. Even that, however can be made speedy by the use of multiple molds. On the other hand, some of the operations can be done faster. For instance, some bench loading tools combine decapping and resizing in one motion; also identify the insertion of the powder charges and the seating of bullets so closely that the time for these operations is much shortened.

In many instances jacketed bullets can be seated perfectly without reaming out the mouths of cases, thus saving an entire operation. This work always can be saved in second and later reloadings of cases. A few lots of cases can be loaded without expanding their necks, provided the resizing die is just right for them, resulting in further saving.

It will be seen that a thousand cartridges can be handloaded in a single day by one man—in a short day at that. This is a rapid and satisfactory rate, worth all it costs to a serious shooter.

The Government (Frankford Arsenal) set of loading tools described in the issue of March 15, 1923, of *Arms and The Man* is hardly to be considered as embodying the principles necessary for the speediest work. It is, however, a thoroughly dependable outfit, including facilities for full length resizing of cases in a lever press, which no small outfit of hand tools includes.

Back in the issue of October 18, 1919, Steven Trask described a new Government reloading outfit intended for the use of troops in barracks. It is intended to be operated by several men when the three-unit machines are worked at one time, and is said to turn out upwards of three thousand cartridges an hour when so manned.

Unfortunately, so far as known to the writer, the Government does not permit any of these outfits to reach the public. A somewhat similar but much less elaborate outfit is embodied in the Frazier loading machine which I believe was once advertised in *Arms and The Man*. It first resizes and decaps the cases and does that work very fast and easily. Then the cases are placed in a drum holding about fifty, where they are recapped, filled with powder and have bullets seated in them before they are removed.

The old Ideal handbooks described Ideal bench tools, consisting of an arbor press for resizing cases and seating bullets, another small press for lubricating and sizing solid bullets, a "Lightning" decapper, a gas-heated lead furnace or pot holding upwards of a hundred pounds of metal, and a multiple bullet mold casting five to ten bullets at a time. There were also a number of small attachments which greatly expedite the various operations.

The resizing press is hardly excelled today for that operation, except that it does not decap and it handles only one case at a time, while some of the other outfits handle two. As a bullet seater this press is inferior to ordinary small hand tools. The decapping and recapping for the outfit usually is done best by an Ideal Straight-line tool, which includes both operations in one. This entire outfit was designed for handling cast bullets, before the day when jacketed bullets were so readily available or so extraordinarily accurate in their shooting.

With every set of heavy bench tools a shooter needs one or more sets of small tools with which to do bits of miscellaneous work without delay or without changing dies. It pays to have them about in order to keep them adjusted for special purposes, available by simply picking them up. The full list of these small tools is given in Chapter 2 of this series.

Several other bench outfits have been made up experimentally at different places over the country, which may not be offered to the public. An individual shooter might pick up one of these.

Multiple molds are available today from several makers, including Yankee, Bond and Ideal. Many old ones, as well as other loading tools, can be bought second hand from various dealers, including Francis Banner-man's Sons of New York. The regular Bond mold is a double one. Ideal molds for several bullets have a trough in the upper side of the base plate or spew-cutter. The melted metal is poured into this trough, where it runs along and fills up hole after hole. Both molds and metal have to be hotter to give

perfect bullets than when the nozzle of a dipper can be placed tightly in a pouring hole of a single mold.

Another tool which will be needed now and then in extensive handloading work is a bullet puller. Owners of questionable war-time ammunition can take it apart with one of these tools, for instance, and reassemble it in much more accurate form in full power or reduced charges. None of these tools are made by the regular loading tool firms. To make one which will pull bullets without marring them or the cases at all, simply bore a hole through a block of soft steel, and ream its diameter to exactly that of the bullets to be pulled, as they measure just in front of the case mouth. Then saw a slot in the block, splitting the block into halves up the hole for an inch and a half or more. Drill a hole sideways through both halves about half an inch from the lower face. In this place a small bolt with a fine thread and a large nut that can be easily tightened. A short wrench is sometimes riveted to the nut.

This block then can be mounted in an Ideal Straightline recapper instead of the punch plunger; or it can be mounted in any small arbor press, and in straightline loading tools, particularly the bullet sentry of the F. A. set of tools. When a cartridge is inserted, with head held in the base slots of the tool, the bullet slips into the block and is clamped there by drawing the two halves together. A half turn of the nut usually will do it. A movement of the tool lever then draws the bullet out of the case mouth easily in a straight line, leaving the case in perfect condition as well as the bullet.

Every large handloading outfit should include several extra resizing dies and other parts subject to wear or subject to much adjustment. There should be dies varying slightly in dimensions, to handle cases of varying temper and wall thickness and bullets of varying diameter. One day's use of a resizing die which is a little soft will wear it out. One often needs these things on short notice.

A requisite for peaceful possession and enjoyable use of a large handloading outfit is a suitable room. The presses and machines must be bolted solidly to a heavy bench or well-secured plank. Sizable boxes of empty cases and other components are bound to accumulate, the whole making too much bulk and weight to be shifted about and too much dirt to be welcomed by a housekeeper. The big tools can not be used in a kitchen or bedroom as can the picket-edition sets, nor in an unheated barn in cold weather.

A floor space six by ten feet is about the smallest space in which they can be worked; double that is better. If a separate room can be devoted to the shooting subject in your house that by all means is the most satisfactory arrangement. Keep the door locked, and make sure that storage of your supply of powder does not conflict with the terms of your insurance.

The Start at Perry

(Concluded from page 11)

team squad which numbered 45 at the beginning was by a process of elimination reduced to 22 within a week.

The standard of shooting at the International Range is of such a high degree that newcomers in the game, while making creditable scores, will probably not have much chance of standing the gaff through the entire tryout. The many days of shooting over and over the International course will naturally insure to the United States Team this year the most consistent of all the shooters who are candidates. Under the system which Major Waller is following it is impossible for any man to get on the team by a fluke. Every one of the successful candidates will have demonstrated, not once or twice, but a dozen times that he is better fitted for a place on the team than those who have been eliminated.

The heavy barrel match rifle if, of course, the only weapon at the International Range. The majority of the shooters are using Springfield actions equipped with the special barrels and stocks specified by the committee in charge of the American Team. There are three of the shooters, however—Commander Osburn, Commander Wilson, and Major Bowles—who brought back with them last year rifles fitted with the Martini actions which are favored above all others on the continent.

Back in 1920, among those civilians who took the course of trapshooting at the National Matches that year, there were several who on the second or third attempt were able to break only six or eight clay birds out of 25. This year many of those same shooters are on the range, having also been here last year. Between seasons they have not had any practice with the scattergun yet are now able to break 22 or 23 birds out of 25. This is the best indication of the work which the Trapshooting Department is doing and of the success which is attending their course of instruction.

For this year's trapshooting there was installed new traps and the service is excellent. So well is the trapshooting organization running that it was possible this year, within a week, to hold a 14,000-bird shoot last Sunday, while the average daily throwing of birds exceeds 7,000.

A new feature of this year's trapshooting is a program of doubles which will be on during the third week of the matches.

The line-up on Commercial Row is as follows:

1. The American Rifleman.
2. Winchester Repeating Arms Co.
3. Hercules Powder Company.
4. Peters Cartridge Company.
5. United States Cartridge Company.
6. Sigmund Eisner Company.
7. E I du Pont de Nemours and Company.
8. Western Cartridge Company.
9. Remington Arms Company.
10. Colt's Patent Firearms Mfg. Company.
11. Smith and Wesson.
12. Harry Pope.
13. U. S. Revolver Association.
14. Greener Shot Guns.
15. J. W. Fecker.
16. Belding and Muhl.

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Assistant Executive Officers

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Brig. Gen. Frank D. Henderson, The Adjutant General of Ohio; National Guard Representative.
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Maj. L. W. T. Waller, Jr., U. S. M. C., Captain U. S. Free Rifle Team.
Maj. K. K. V. Casey, Wilmington, Del., Capt. U. S. Palma Trophy Team.
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Maj. George R. Harrison, Infantry, Militia Bureau Representative.
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Maj. John J. Dooley, U. S. M. C. R., Director of Scorers; Instructor in Range Operation.
Capt. Harlan L. Mumma, Infantry, Camp Director.
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Aids to Executive Officer

Capt. Frank A. Jones, Infantry.
1st Lieut. Robert G. Lovett, Corps of Engineers.

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Maj. Paul W. Newgarden, Infantry, Assistant Director of Administration.
Capt. N. W. Richmond, 22d Inf., Adjutant National Matches; Camp Adj.
Capt. Ernest W. Ely, 2d Infantry, Personnel Adjutant.
Capt. A. R. Brian, 42d Inf., Headquarters Commandant; Police Officer.
Lieut. Col. Alvin S. Perkins, Cavalry, Camp Inspector; Summary Court.
Maj. Thomas J. Flynn, M. C., Camp Surgeon and Sanitary Inspector.
Maj. Charles E. Ide, Field Artillery, Provost Marshal, Fire Marshal.
Maj. Wm. A. McCain, Q. M. Corps, Director of Supplies.
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1st Lieut. Kent J. Nelson, Infantry, Mess Finance Officer.
Maj. S. H. MacGregor, Ord. Dept., Director of Arms and Ammunition.
Capt. Mark M. Serrem, Ord. Dept., Ordnance Supply Officer.
Capt. C. M. Exley, F. D., Finance Officer.
1st Lieut. A. Donald Cameron, Infantry, in charge of message center.
Lieut. Col. A. B. Critchfield, Infantry, Reserve Corps; Director of Range Equipment and Preparation.
Lieut. Col. Edward A. Keyes, Cavalry, Chief Range Officer.
Col. John Caswell, New York, Director of Trapshooting.
Capt. Grosvenor L. Wotkins, Infantry, Director of Small-Bore Shooting.
Capt. Francis B. L. Myer, Infantry, Officer in Charge of Range Details.
Capt. Clifton M. Brown, Infantry, Director of Statistics.
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Capt. Francis G. Bonham, 6th Infantry, Assistant Director of Training.
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Lieut. Col. Frank Maloney, Infantry, Reserve Corps, Assistant Director, in charge of National Guard Teams.
Lieut. Col. Lewis M. Rumsey, Jr., Infantry, Reserve Corps, Assistant Director, in charge of Pistol Practice.
Maj. George W. C. Whiting, 4th Infantry, Assistant Director, in charge of C. M. T. C. Teams.

Winchester Junior Rifle Corps, Coys' Camp of Instruction

Mr. B. M. Russell, National Executive, W. J. R. C. Director.
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Mr. J. James Squier, State Field Secretary, Ohio, Y. M. C. A.
Mr. Drummond of Columbus, Ohio.

Hostess House

Miss Amanda Thomas, Hostess.
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Maj. Harold F. Wirgman, U. S. M. C.

Associated Press Representative

Mr. Louis S. Warner, Port Clinton, Ohio.
Commanding Officer, U. S. Troops
Col. Berkeley Enochs, 28th Infantry.

Range Maintenance Troops

Co. "E" and "F," 2d Infantry, Capt. Arthur J. Stark, 2d Inf. Commanding.
Among the instructors assigned to teams for the School of Instruction Period are:

National Guard Teams

Lieut. Col. Frank Maloney, Infantry, O. R. C., In Charge.

Group

1. Alabama—1st Lieut. J. J. Yeats, 10th Infantry.
2. Arizona—Capt. E. S. Beall, 10th Infantry.
3. Arkansas—Capt. A. T. Wright, 18th Infantry.
4. Colorado—1st Lieut. J. L. Gibney, 12th Infantry.
5. Connecticut—1st Lieut. D. W. Griffiths, Corps of Engineers.
6. Delaware—2d Lieut. R. Selee, Corps of Engineers.
7. District of Columbia—Capt. H. H. Leizear, D. C. N. G.
8. Florida—Capt. P. L. Ransom, Infantry.
9. California—Capt. C. D. Lewis, 10th Infantry.
10. Georgia—1st Lieut. D. Sanders, 5th Infantry.
11. Idaho—1st Lieut. J. D. Bender, 10th Infantry.
12. Illinois—Capt. M. G. Browne, Infantry.
13. Indiana—Lieut. Col. Basil Middleton, Indiana N. G.
14. Iowa—Maj. F. S. Hird, Iowa N. G.
15. Kansas—Maj. H. G. Utley, O. R. C.
16. Kentucky—Capt. M. F. Shepherd, 17th Infantry.
17. Louisiana—Capt. D. A. Preussner, O. R. C.
18. Massachusetts—Maj. C. D. Berg, Massachusetts N. G.
19. Michigan—Capt. W. L. Smith, Infantry.
20. Minnesota—Maj. B. F. Ristine, 11th Infantry.
21. Mississippi—Lieut. Col. F. L. Simmons, O. R. C.
22. Missouri—Maj. J. Plassmeyer, Cavalry.
23. Montana—Capt. C. E. Dissinger, 4th Cavalry.
24. Nebraska—Capt. R. L. Crosson, Nebraska N. G.
25. New Hampshire—1st Lieut. Z. I. Adair, 2d Infantry.
26. New York—Col. F. M. Waterbury, N. Y. N. G.
27. North Carolina—1st Lieut. A. M. Siler, 16th Infantry.
28. North Dakota—Capt. E. W. Budy, 11th Infantry.
29. Ohio—1st Lieut. C. C. Rice, Ohio N. G.
30. Oklahoma—1st Lieut. J. H. Windsor, O. R. C.
31. Oregon—2d Lieut. F. C. McConnell, C. A. C.
32. Pennsylvania—Capt. A. Floyd, Infantry.
33. Rhode Island—1st Lieut. P. E. Tripp, 10th Infantry.
34. South Carolina—1st Lieut. F. M. Smith, 11th Infantry.
35. Tennessee—Maj. W. H. Hyde, O. R. C.
36. New Mexico—1st Lieut. A. D. Rothrock, 29th Infantry.
37. Texas—Capt. T. K. Petty, Cavalry.
38. Utah—Capt. C. F. Silvester, 38th Infantry.
39. Vermont—Capt. J. H. Keough, O. R. C.
40. Virginia—Capt. R. Alderman, O. R. C.
41. Washington—Maj. A. Logan, Wash. N. G.
42. West Virginia—Capt. W. McK. Spann, Infantry.
43. Wyoming—Capt. G. Fletcher, O. R. C.

C M T C Teams

Maj. G. W. C. Whiting, 4th Infantry, In Charge.

44. 1st Corps Area—Capt. A. E. Andrews, 1st Infantry.
45. 2nd Corps Area—1st Lieut. W. R. Watson, 5th Infantry.
46. 3rd Corps Area—1st Lieut. J. H. Healy, 10th Cavalry.
47. 4th Corps Area—1st Lieut. D. L. Robinson, 11th Infantry.
48. 5th Corps Area—1st Lieut. G. L. Hartman, 6th Infantry.
49. 6th Corps Area—Capt. C. M. Lyons, 24th Infantry.
50. 7th Corps Area—Capt. C. A. Gray, 17th Infantry.
51. 8th Corps Area—1st Lieut. L. J. Harant, 23rd Infantry.
1st Lieut. D. A. Bissett, 23rd Infantry.
52. 9th Corps Area—Capt. J. S. Schwab, 24th Infantry.
Capt. C. W. Chalker, 38th Infantry.

R O T C Students

Lieut. Col. O. F. Snyder, U. S. A. Retired, In Charge.

53. Group I—Capt. W. P. Waltz, Infantry.
1st Lieut. C. H. Calais, 11th Infantry.
54. Group II—Capt. J. P. Lyons, Infantry.
1st Lieut. T. A. Dukes, 3d Infantry.
55. Group III—Capt. C. A. Wilkinson, 11th Cavalry.
1st Lieut. F. H. Privett, 29th Infantry.

SEA GIRL'S TOURNAMENT

(Concluded from page 2)

pected to exert a psychological influence against such a result, but apparently buck fever is a stranger to Doyle.

A better understanding of how this long run was possible comes from knowing the man who made it. Edward John Doyle is 23 years old, an athlete who neither smokes nor drinks and who possesses a remarkably fine physique. Doyle enlisted in the Marine Corps in 1919. In fact, his present enlistment expired in July but, as a member of the Marine Squad, he was held over until after this year's matches.

He shot first in 1920, when he won fourth place in the South Eastern Division competition. By September of that year he had won a place of principal on the Marine Corps First Team. That year he also won third place in the President's Match. During the season of 1921 he was not with the team, but rejoined in 1922. Whenever he has been with the team he has been a shooting member in such big events as the Hayden, Dryden, McAlpin, and Sadler Matches, and has been regarded as a very skilled and dependable team shot, so that his accomplishment in the Swiss Match was a surprise to all of his fellows.

Doyle is said to be ineligible for the National Match team this year.

At Sea Girl, in command of a Regimental rifle team, this year there appeared that old timer who back in Nineteen-fifteen and Sixteen was of the bone and sinew of the Leatherneck teams, Archie Farquharson. He is now a Captain, and has gotten together a hard shooting bunch. His men on the fourth day of the tournament, representing the Fifth Marine Regiment, cleaned up the Cruickshank Match—7 shots each at 200 yards off-hand, 500 yards and 600 yards prone, on a score of 575 over that of the Tenth Marine Regiment Team of 561.

In the All Comers Expert Match on the same day, John M. Thomas came to the front again. In the event which called for 10 shots prone at 600 yards, Thomas, Maj. G. W. Price of the Infantry, and Marine Gunner Lloyd, all registered possibles. Again over the course, Thomas and Price repeated the possible score, while Lloyd dropped out on a 48. In the second shoot off, Thomas scored 49 to Maj. Price's 48.

The Nevada Trophy Match, attended by very difficult conditions of wind and light, concluded the fourth day's shooting at ranges of 600, 900, and 1,000 yards. The event was taken by 1st Lieut. M. L. Broderick of the Infantry with 148; Thomas of the Marines in second place one point behind him.

Friday, August 31, was Infantry Day. It was not so designated in the program, and the Marines put up a stiff fight to prevent but in spite of the high degree of skill the Marines showed in the McAlpin and the Dryden Matches, the Doughboys took both events.

In the Dryden—10 shots each at 200 yards standing, 600 yards and 1,000 yards prone—the Second Infantry team took the lead in the

off-hand stage with 372 points, the Second Marines following them with 368 points and First Marines third with 360. At the conclusion of the 600-yard stage, the First Infantry still had the advantage on an aggregate of 766 points, with the Second Marines second on 760 points, and the First Infantry in third place with 746 points, having displaced the First Marines. At 1,000 yards, both the First and Second Infantry Teams added 384 points to their totals, but this did not help the First Infantrymen, who had been well down the list as the result of the two earlier stages, and the event was taken by the Second Infantry Team with a total of 1150 points, the Second Marines second on 1138 points, and the First Marines third on 1129 points.

In the McAlpin, over the same course, the Infantry Second Team repeated its victory. The shooting started with the First Infantry Team in the lead on a score of 372 off-hand, the Marine Corps First Team and the Infantry Second tied for second place on 371 points, and the Marine Corps Second in fourth place on 369 points. At 600 yards the Second Infantrymen with a total score of 763 points went to the head of the list, with the First Marines second on 756 points, and the Second Marines third on 753 points. With a remarkably good score, considering the conditions, at 1,000 yards, the Second Doughboys clinched their title to the match by adding 392 points to their score, better than any of the others were able to do, and the match concluded in their favor on a team total of 1155 points, the First Infantrymen second with 1149 points, and the First Marines third with 1142 points.

The shooting of the Spencer Match late in the afternoon, calling for fifteen shots at 1200 yards, developed one of the strangest ties in the history of shooting.

First Sgt. W. F. Lay of the Infantry, shooting the service rifle and sights, and L. J. Miller of the Brooklyn, N. Y., Rifle Club, shooting a telescopically sighted rifle, when the shooting was ended were discovered to have the same totals—72 out of 75—with Priv. White and Gy. Sgt. Cleary of the Marines behind them with totals of 70. The tie between Cleary and White was easily settled, but an examination of the score cards of Lay and Miller disclosed that so far as the Creedmoor count was concerned, with all its variations, the tie remained, for Lay and Miller had each made a 4 on the first record shot and a 3 on the 10th record shot. Failing to settle the tie by the rules it was agreed to shoot it off shot by shot and Lay with his service sights sent over a 3. Miller with his telescope recorded a 4 and the match was awarded to him. Mathematicians about the range immediately began figuring the chances of such a tie occurring in a match such as the Spencer and it was the consensus of opinion that the chance of such a tie is about one in approximately thirty-nine millions.

The Infantry's run of victories in the McAlpin and the Dryden continued in the next day's shooting when they took first and second places in the Sadler Match at 800, 900 and 1,000 yards, resulting in a team score for the Infantry Second Team of 1775 points, with

the First Infantry second on 1761 points and the First Marines third with 1759 points.

Considerable of the remainder of the Sea Girl matches, with the exception of the Sea Girl National Individual and the Sea Girl Championship Team Matches which wound up the shooting season on the New Jersey range, was devoted to company team and regimental team matches especially staged by General Bird W. Spencer for the purpose of building up enthusiasm in competition among National Guard units. These competitions, purposely, presented courses of fire in which the lesser skilled type of marksman would have a show for enjoyable competition and at the same time be grounded in those principles of marksmanship contests which underlay more complicated and difficult events.

When the teams lined up for the Sea Girl National Team Match, the Marines off-set a part of their former defeats by rolling up a score of 2837 over the national match course 26 points better than the Second Marines, who were tied with but outranked the First Infantry. The Doughboys came back at the Leathernecks, however, by walking away with the Sea Girl National Individual Match.

Labor Day week-end saw the Sea Girl range invaded by an enthusiastic crew of .22 caliber shooters who had the range all to themselves Sunday and most of Labor Day.

On the porch of the Club House there sat a woman visitor, whose acquaintance, it later developed, with rifle shooting had been limited largely to stories of Turkey and Live Bird matches. To her, where she sat, came the spiteful popping of the little cartridges as a squadded match progressed.

"What's going on over there?" the visitor inquired of an Infantry officer.

"Small-Bore shooting, madam," the officer replied.

"Oh, tell me," the visitor cried, "do they really shoot the little pigs, or just shoot for them?"

Strolling down the firing line, among the small-bore crowd, it became evident that before long there will be developed an especial line of feminine shooting accessories. Paddy O'Hare take notice that Miss Jimmy Hansman is the creator of a distinctly feminine form of the familiar "sweat band," except that her's is primarily designed to keep stray tendrils of hair from breaking loose and blowing into the shooter's eyes at untoward moments.

It is also noticeable that the small-bore shooter's equipment is becoming fully as large as that demanded in full charge work, and the most enthusiastic of the small-borers today, as exemplified by the Sea Girl crowd, are packing around all sorts of paraphernalia—and using it, too, in the running up of really remarkable scores.

Nor will it be long before the sight of a small-bore rifle in its original "as purchased" or "as issued" form, will be hard to locate. This is the era of the remodeled rifle, as the many thousands of dressed-up Springfields will testify, and the lure of the "tailor-made" rifle to fit individual tastes has taken a strong hold on the .22 caliber clan. Undoubtedly the remodeling of rifles and the hand-loading

of ammunition has done much in stimulating the development of the service rifle to its present standard of super-accuracy, and the same beneficial results may be expected from the careful alteration of small-bore rifles which is now going on among the small-bore shooters. As a matter of fact, the fitting of barrels to time-tried actions, such as the Ballard, and the Martini by shooters in search of the best individual combination has already had its effect in a new American-made small-bore rifle, fitted with a Martini action and American type stock and barrel. This rifle, two of which were exhibited to the small-bore shooters at Sea Girt, and will be on hand at Camp Perry, have been completed by the Remington Company.

The Small-Bore Matches at Sea Girt held in connection with the service rifle matches, while lacking somewhat in the numbers that had attended precious small-bore meetings, did not lack in enthusiasm. No very remarkable scores were made, due principally to the weather conditions, but the shooting showed a very high degree of skill. It was also unfortunate that in many of the re-entry matches in which the best score was only to count, no provision was made for deciding ties, and in consequence the prizes were divided among those with a claim to prize positions.

Winners and Runners Up in the various events follow:

WINGATE MATCH			
1. W. H. O'Mohundro, 1st Lt. U. S. Inf.	10-10	Trophy and	\$17.50
2. S. S. MacLaughlin, Capt. U. S. Inf.	10-1		12.50
3. A. J. Podrasa, Cpl. USMC.	10		10.00
4. R. E. Vermette, Lt. U. S. Inf.	9		8.00
5. S. R. Hinds, 1st Lt. U. S. Inf.	9		7.00
6. J. A. Kneubel, Capt. U. S. Inf.	9		6.00
7. S. P. Roberts, Corp. USMC.	9		5.00
8. J. V. Alexander, Pvt. USMC.	9		5.00
9. H. C. Mason, Pvt. USMC.	9		5.00
10. A. K. Robinson, Kt. USMC.	9		5.00

MEANY MATCH			
1. C. H. Lloyd, N. G. USMC.	50-25	Medal and	\$17.50
2. C. F. Crisp, Lt. USMC.	50-7	Tie	11.25
3. W. A. Conover, 1st Lt. U. S. Inf.	50-7		11.25
4. J. V. V. Schoonmaker, Lt. NGNJ.	50-6		6.00
5. E. Wilson, Corp. USMC.	50-4		7.00
6. G. L. Stephenson, Sgt. USMC.	50-3		6.00
7. P. C. Conradt, 2d Lt. USMC.	50-1		6.00
8. J. M. Thomas, USMC.	40		6.00
9. W. M. Beckett, Cpl. USMC.	49		5.00
10. H. B. Humphrey, Capt. USMC.	49		5.00

INTERSTATE REGIMENTAL TEAM MATCH			
1. 5th Reg., USMC.	772	Trophy and	\$3.00
2. 10th Reg., USMC.	748		1.50

71ST REGIMENT TROPHY MATCH			
1. 5th Reg., USMC.	1059	Trophy and	\$6.00
2. 10th Reg., USMC.	1057		4.00

GOULD INDIVIDUAL RAPID FIRE MATCH			
1. U. V. Jones, Lt. U. S. Inf.	100-8-8		\$17.50
2. J. Jackson, Capt. USMC.	100-8-7		12.50

3. G. W. Price, Maj., U. S. Inf.	100-8-5	10.00
4. R. L. Jennings, Sgt. USMC.	100-8-4	8.00
5. S. W. Ashurst, Capt. USMC.	100-7	5.85
6. E. F. Holzhaner, Sgt. USMC.	100-7	5.85
7. F. Rames, Major, U. S. Inf.	100-7	5.85
8. L. P. Cartier, Sgt. Maj., USMC.	100-7	5.85
9. J. R. Tucker, Cpl. USMC.	100-7	5.85
10. O. F. Mollerstrom, 1st Sgt. U. S. Inf.	100-7	5.85

COMPANY TEAM MATCH			
1. Anti-Aircraft Co., 10 Reg., USMC.	400	Score	Prize
2. Troop B, 103rd Cavalry, Pa.	353		Medals

COMPANY TEAM (TYRO)			
1. Anti-Aircraft Co., 10th Reg., USMC.	175	Score	Prize
2. Troop B, 103rd Cavalry, Pa.	168		1.25
3. Company E, 104th Engineers	162		.75

ROE ALL COMERS LONG RANGE			
1. G. D. White, Pvt. USMC.	100-11	Score	Prize
2. M. L. Broderick, Lt. U. S. Inf.	99		\$17.50
3. L. V. Jones, Lt. U. S. Inf.	99		11.25
4. P. F. Mollerstrom, 1st Sgt. U. S. Inf.	99		11.25
5. W. C. Conover, Lt. U. S. Inf.	99		8.00
6. R. T. Presnell, Lt. USMC.	98		7.00
7. H. Whitaker, Warrant Off., U. S. Inf.	98		6.00
8. W. W. Ashurst, Capt. USMC.	98		6.00
9. J. W. McCormick, Capt. U. S. Inf.	98		6.00
10. J. Jackson, Capt. USMC.	98		5.00

ROGERS ALL COMERS			
1. J. M. Thomas, G. Sgt. USMC.	100-37	Score	Prize
2. W. J. Scheyer, Lt. USMC.	100-24		\$17.50
3. J. W. McCormick, Capt. U. S. Inf.	100-17		12.50
4. E. J. Blade, Sgt. USMC.	100-15		10.00
5. W. H. D'Mohundro, Lt. U. S. Inf.	100-12		8.00
6. R. L. Mason, Pvt. USMC.	100-2		7.00
7. E. J. Doyle, Sgt. USMC.	100		6.00
8. L. D. Wilson, Corp. USMC.	99		6.00
9. V. S. Smith, Corp. USMC.	99		5.50
10. M. H. Johnson, Corp. USMC.	99		5.50

SWISS MATCH			
1. E. J. Doyle, Sgt. USMC.	200	Bulls-Eyes-Prize	\$17.50-Watch
2. J. L. Tupper, Capt. U. S. Inf.	23		12.50-Medal
3. V. Richard, Qui. R. C.	21		10.00
4. A. J. Padrasa, Corp. U. S. M. C.	20		8.00
5. C. A. Lloyd, M. G., U. S. M. C.	15		6.00
6. N. Tullman, 1st Sgt. U. S. M. C.	15		6.00
7. B. E. Cleary, G. Sgt. U. S. M. C.	15		6.00
8. M. B. Humphrey, Capt. U. S. M. C.	10		5.00
9. L. J. Miller, Brooklyn R. C.	9		5.00
10. W. F. Lay, 1st Sgt. U. S. Inf.	8		5.00

ALL COMERS EXPERT MATCH			
1. J. M. Thomas, G. Sgt. U. S. M. C.	50-50-49		\$17.50
2. G. W. Price, Maj. U. S. Inf.	50-50-48		12.50
3. C. A. Lloyd, M. G., U. S. M. C.	50-48		10.00
4. H. K. Prickett, Capt. U. S. M. C.	50-46		8.00
5. L. D. Wilson, Corp. U. S. M. C.	50-45		7.00
6. H. Whitaker, W. O., U. S. Inf.	40-50		6.00
7. J. W. Walde, Corp. U. S. M. C.	49-49		5.66
8. V. S. Smith, Corp. U. S. M. C.	49-49		5.66
9. W. C. Conover, Lt. U. S. Inf.	49-49		5.66
10. B. E. Clements, Corp. U. S. M. C.	49-48		5.00

CRUIKSHANK TROPHY			
1. 5th Reg., U. S. M. C.	575		\$7.20-Trophy
2. 10th Reg., U. S. M. C.	561		3.60

DRYDEN			
1. U. S. Inf., 2d team.	1150	Score	Prize
2. U. S. M. C., 2d team.	1138		\$100.00
3. U. S. M. C., 1st team.	1129		75.00
4. U. S. Inf., 1st team.	1123		50.00

5. U. S. M. C., 3d team.	1105		
6. N. J. N. G. Team.	1016		

MCALPIN			
1. U. S. Inf., 2d team.	1155	Score	Prize
2. U. S. Inf., 1st team.	1149		\$36.00
3. U. S. M. C., 1st team.	1142		24.00
4. U. S. M. C., 3d team.	1130		
5. U. S. M. C., 2d team.	1129		
6. N. J. N. G., 1st team.	991		

SPENCER			
1. L. J. Miller, Brooklyn, N. Y. Inf.	72-4	Score	Prize
2. W. F. Lay, 1st Sgt., U. S. Inf.	72-3		\$22.50
3. G. D. White, Pvt. USMC.	70		15.00
4. B. E. Cleary, G. Sgt., USMC.	70		13.50
5. L. Petrosky, Corp., USMC.	69		12.00
6. E. F. Holzhaner, Sgt., USMC.	69		10.00
7. L. V. Jones, 1st Lt., U. S. Inf.	69		9.00
8. E. Feury, Pvt. USMC.	69		7.50
9. C. F. Crisp, Lt., USMC.	68		7.50
10. R. T. Presnell, Lt., USMC.	68		6.00

NEVADA TROPHY			
1. M. L. Broderick, 1st Sgt. U. S. Inf.	148		\$41.25-Medal
2. J. M. Thomas, G. S., USMC.	147		28.75
3. W. M. Beckett, Corp., USMC.	147		22.50
4. H. Whitaker, W. O., U. S. Inf.	146		17.50
5. R. E. Vermette, 1st Lt., U. S. Inf.	146		15.00
6. G. D. White, Pvt., U. S. M. C.	145		12.50
7. H. K. Pickett, Capt., U. S. M. C.	145		12.50
8. W. C. Conover, 1st Lt., U. S. Inf.	145		11.25
9. E. J. Doyle, Sgt. U. S. M. C.	145		11.25
10. S. P. Roberts, Corp., U. S. M. C.	145		10.00

BOYLE MATCH, 1923			
1. G. L. Amouroux.		American Flag	\$4.60
2. R. H. Lummis, Old Guard.			2.50
3. Sgt. Lay, U. S. Inf.			2.50
4. J. Branchi, 71st N. J. N. G.			1.50
5. Capt. Bryan, Old Guard.			1.00
6. H. L. Bryan, Old Guard.			1.00

READING MATCH			
R. R. Street, U. S. Inf.		Score	50
Frank LaRue, U. S. Inf.			50
R. T. Presnell, U. S. M. Tyro.			49
Members' Match			
Youle T. Frazee, Montclair, N. J.			48

REVOLVER TEAM MATCH			
1. N. S. M. C. Rifle and Pistol Team—1st Team.	1080	Score	Prize
2. N. S. M. C. Rifle and Pistol Team—2nd Team.	997		\$7.50
3. 51st Machine Gun Squadron, N. Y.	697		7.50

OLD GUARD TROPHY MATCH			
1. 71st Regiment Veteran Assn. Rifle Club	246	Score	Prize
2. Old Guard, New York.	230		\$9.00
3. 71st Regiment Veteran Assn. Rifle Club	188		6.00

SADLER MATCH			
1. U. S. Infantry, Team No. 2.	1775	Score	Prize
2. U. S. Infantry, Team No. 1.	1761		\$23.40-Medals
3. U. S. Marines, Team No. 1.	1759		11.70
			3.90

GOVERNOR'S CHAMPION MARKSMAN MATCH			
1st Lieut. John V. V. Schoonmaker, N. J.	322	Score	Prize
			Medal

SEA GIRT NATIONAL TEAM MATCH			
1. U. S. M. C. Team No. 1.	2337	Score	Prize
2. U. S. M. C. Team No. 2.	2311		\$19.20
3. U. S. Infantry.	2311		9.60

REGIMENTAL TEAM MATCH, STATE			
1. 102d Cavalry, 1st Team	2463	Score	Prize
2. 102d Cavalry, 2d Team.	2313		Trophy-Medals
3. 113th Infantry	2270		Trophy-Medals
4. 114th Infantry	2162		
5. 104th Engineers	2083		

CAVALRY TEAM MATCH

	Score	Prize
1. Troop B, 102d Cavalry, N. J. 1st Team	369	\$22.50
2. Troop B, 102d Cavalry, N. J. 4th Team	336	11.25
3. Troop B, 103d Cavalry, Pa.	313	3.75

VETERAN ORGANIZATION MATCH

	Score	Prize
1. 71st Regiment Veteran Organization, N. Y.	259	Trophy
2. 4th Regiment Veteran Rifle Assn	224	
3. 71st Regiment Veteran Organization, N. Y.	219	
4. Old Guard, N. Y.	217	

LONG DISTANCE MATCH, STATE

	Score
1. Lieut. J. V. V. Schoonmaker, 113th Inf.	97
2. Col. W. D. Price, 114th Inf.	95
3. Lieut. Geo. H. Entwistle, 104th Eng.	92
4. Capt. H. M. Disbrow, 114th Inf.	90
5. Major C. W. Shivers, 114th Inf.	89
6. Lieut. Grayson E. Armstrong, 113th Inf.	88
7. Corp. G. Smith, 113th Inf.	88

COMPANY TEAM MATCH, STATE

	Score	Prize
1. Troop B, 102d Cavalry, N. J., 1st Team	1545	Medals and trophy
2. Troop B, 102d Cavalry, N. J., 3d Team	1413	Medals and trophy
3. Troop B, 102d Cavalry, N. J., 2d Team	1350	Medals and trophy

SEA GIRT NATIONAL INDIVIDUAL PISTOL MATCH

	Score	Prize
1. Lieut. N. J. Whaling, USMC	270	\$10.00
2. Sgt. L. M. Thomas, USMC	268	7.50
3. Pvt. T. Krause, USMC	267	5.00
4. Pvt. T. Krause, USMC	266	5.00
5. L. Peters, G. Sgt., USMC	265	4.00

NATIONAL INDIVIDUAL MATCH

	Score	Prize
1. Lieut. G. R. Hinis, U. S. Inf.	293	\$26.25
2. Sgt. N. J. Doyle, USMC	291	18.75
3. Corp. J. R. Tucker, USMC	289	15.00
4. Sgt. R. C. Coulter, USMC	209	12.00
5. Corp. L. Petrosky, USMC	287	10.50
6. Lieut. F. E. Conrad, USMC	285	10.50
7. Pvt. H. L. Nason, USMC	284	9.00
8. Lt. A. E. Robinson, U. S. Inf.	284	9.00
9. Sgt. F. H. Hasbrouck, USMC	284	7.50
10. Corp. A. J. Podraza, USMC	284	7.50

TWO-MAN TEAM MATCH

	Score	Prize
1. Capt. D. M. Bartow and G. R. Hinds, U. S. Inf.	198	\$53.50
2. Corp. N. W. Walde and 1st Sgt. N. Pillman, USMC	198	28.25
3. 1st Sgt. D. Valenage and 1st Sgt. W. F. Lay, U. S. Inf.	198	9.75

LIBBEY TROPHY

	Score	Prize
1. C. A. Loyd, USMC	71	\$18.75
2. Corp. G. L. Sharp, USMC	69	15.00
3. J. W. Thomas, USMC	69	11.25
4. A. J. Podraza, USMC	68	7.50
5. J. V. V. Schoonmaker, N.J.N.G.	66	6.00
Tyros		
6. B. E. Clements, USMC	63	4.50
7. G. R. Roberts, USMC	62	4.50

SEA GIRT CHAMPIONSHIP

	Score	Prize
1. Corp. E. Wilson, USMC	192	Medal and \$18.75
2. 1st Sgt. N. Tillman, USMC	191	15.00
3. 1st Sgt. J. A. Wooten, USMC	190	11.25
4. Pvt. J. V. Alexander, USMC	189	7.12
5. Corporal J. R. Tucker, USMC	189	7.12
6. Private G. D. White, USMC	187	6.00
Tyros		
7. Pvt. L. Will, USMC	186	4.50
8. 1st Lieut. R. T. Presnell, USMC	185	4.50
9. Pvt. E. Feury, USMC	179	4.50

SEA GIRT NATIONAL PISTOL TEAM MATCH

	Score	Prize
1. U. S. Marine Corps, 1st Team	1287	\$9.00
2. U. S. Marine Corps, 2d Team	1244	4.50
3. U. S. Infantry	1239	1.50

COMPANY TEAM MATCH, STATE

	Score	Prize
1. Troop B, 102d Cavalry, N. J. 1st Team	1545	Medals and Trophy
2. Troop B, 102d Cavalry, N. J. 3d Team	1413	Medals and Trophy
3. Troop B, 102d Cavalry, N. J. 2d Team	1350	Medals and Trophy

LONG DISTANCE MATCH, STATE

	Score
1. Lt. John V. V. Schoemaker, 113th Inf.	97
2. Colonel W. S. Price, 114th Inf.	95
3. Lieut. George H. Entwistle, 104th Eng.	92
4. Captain H. M. Disbrow, 114th Inf.	90
5. Major C. W. Shivers, 114th Inf.	89
6. Lieut. Grayson E. Armstrong, 113th Inf.	88
7. Corporal G. Smith, 113th Inf.	88

VETERAN ORGANIZATION MATCH

	Score	Prize
1. 71st Regiment Vet. Organization, N. Y.	259	Trophy
2. 4th Regiment Vet. Rifle Assn	224	
3. 71st Regiment Vet. Organization, N. Y.	219	
4. Old Guard, N. Y.	217	

CAVALRY TEAM MATCH

	Score	Prize
1. Troop B, 102d Cavalry, N. J. 1st Team	369	\$22.50
2. Troop B, 102d Cavalry, N. J. 4th Team	336	11.25
3. Troop B, 103d Cavalry, Pa.	313	3.75

REGIMENTAL TEAM MATCH

	Score	Prize
1. 102d Cavalry, 1st Team	2463	Medals and Trophy
2. 102d Cavalry, 2d Team	2313	Medals and Trophy
3. 113th Infantry	2270	
4. 114th Infantry	2163	
5. 104th Engineers	2083	

SEA GIRT NATIONAL TEAM MATCH

	Score	Prize
1. U. S. M. C., Team No. 1	2837	\$19.20
2. U. S. M. C., Team No. 2	2811	9.60
3. U. S. Infantry	2811	3.20

GOVERNOR'S CHAMPION MARKSMAN MATCH

	Score	Prize
1st Lieut. John V. V. Schoonmaker, N. J.	322	Medal

SADLER MATCH

	Score	Prize
1. U. S. Infantry, Team No. 2	1775	\$23.40 and Medal
2. U. S. Infantry, Team No. 1	1761	11.70
3. U. S. Marines, Team No. 1	1759	3.90

EISNER MATCH

	Score	Prize
1. John A. Enonbol, U. S. Inf.	97	Uniform
2. 1st Lt. M. L. Broderick, U. S. Inf.	95	
3. 1st Sgt. W. F. Fay, U. S. Inf.	95	
4. Capt. J. W. McCormick, U. S. Inf.	95	
5. H. L. Mason, Pvt. U. S. M. C.	95	
6. Pvt. G. O. White, U. S. M. C.	94	
7. Mar. Gunner C. A. Lloyd, U. S. M. C.	94	
8. Gy. Sgt. Bill E. Clary, U. S. M. C.	94	
9. Gy. Sgt. John M. Thomas, U. S. M. C.	94	
10. Capt. W. W. Ashhurst, U. S. M. C.	94	

HAYES MATCH

	Score	Prize
1. W. F. Lay, 1st Sgt. U. S. Inf.	50+11	\$20.00
2. G. L. Sharp, Corp. USMC	50+9	15.00
3. W. W. Ashurst, Cap. USMC	50+9	10.00
4. J. W. McCormick, Capt. U. S. Inf.	50+7	8.00
5. C. F. Criss, 2d Lt. USMC	50+6	7.00
6. M. L. Broderick, 1st Lt. U. S. Inf.	50+4	7.00
7. W. H. O'Monandro, 1st Lt. U. S. Inf.	50+3	6.00
8. E. J. Blade, Sgt. USMC	50+3	6.00
9. Will Tonic, Pvt. USMC	50+3	5.00
10. W. J. Scheyer, 2d Lt. USMC	50+2	5.00

SHORT RANGE RE-ENTRY MATCH

	Score	Prize
D. Baker	100	\$1.62
L. J. Corsa	100	1.62
Miss Jimmy Hansman	100	1.62
C. H. Johnson	100	1.62
H. K. Mann	100	1.62
L. J. Miller	100	1.62

N. R. A. TEAM CHAMPIONSHIP

	Score	Prize
1. Frankford Arsenal Rifle Club	766	\$3.75
J. A. Willners		
R. H. Betts		
J. B. Cilley		
C. H. Johnson		
2. Brooklyn Rifle Club	763	2.50

L. J. Miller

	Score	Prize
D. Baker		
L. J. Corsa		
C. St. John		
3. Manhattan R. & P. Club	753	1.62
J. M. Hilborm		
J. A. Dietz		
L. Manville		
J. Martin		

4. Yankee Rifle Club	703	1.5
G. Demeter		
S. M. Milman		
G. Amouroy		
L. P. Wood		

LONG RANGE RE-ENTRY MATCH

	Score	Prize
1. L. B. Cooley	50	\$3.19
2. G. Demeter	50	3.0
3. H. K. Mann	50	3.0
4. J. Martin	50	3.0
5. L. J. Miller	50	3.0

SMALL-BORE LONG RANGE MATCH

	Score	Prize
1. L. J. Corsa	99	\$6.25—Medal
2. G. F. H. Koenig	99	5.00—Medal
3. L. Manville	99	3.75—Medal
4. D. Baker	99	2.50
5. S. M. Milman	98	2.00

N. R. A. SMALL-BORE MATCH

	Score	Prize
1. L. J. Corsa	97	\$1.23
2. H. K. Mann	96	.62
C. H. Johnson	96	.62

EISNER 100 YARDS MATCH

	Score	Prize
1. J. A. Willners	99	\$3.50—Uniform
2. G. B. Sheldon	98	2.50

SHORT RANGE MATCH

	Score	Prize
1. R. H. Betts	99	\$1.90
L. J. Corsa	99	1.90
C. H. Johnson	99	1.90
2. Miss Jimmy Hansman	98	.34
G. Demeter	98	.34
C. St. John	98	.34
J. A. Willners	98	.34

SEA GIRT SMALL-BORE CHAMPIONSHIP

	Score	Prize
1. C. St. John	245	\$5.00—Medal
2. J. Martin	242	3.75—Medal
3. L. Manville	242	2.50—Medal
4. G. Koenig	242	2.50
5. D. Baker	241	2.00

INDIVIDUAL SMALL-BORE DRYDEN

	Score	Prize
1. G. F. H. Koenig	223	\$1.66—Medal
2. W. A. Mackey	223	1.66—Medal
3. D. Baker	223	1.66—Medal
4. L. J. Miller	222	.94
5. R. H. Bettie	222	.94
6. H. K. Mann	222	.94
7. L. Manville	222	.94
8. C. H. Johnson	221	.94
9. H. W. Dawson	220	.62

SEA GIRT NATIONAL PISTOL TEAM MATCH

	Score	Prize
1. U. S. Marine Corps, 1st team	1277	\$9.00
2. U. S. Infantry	1249	4.50
3. U. S. Marine Corps, 2d team	1244	1.50

SEA GIRT NATIONAL INDIVIDUAL PISTOL MATCH

	Score	Prize
1. Lt. N. J. Whaling, USMC	270	\$10.00
2. G. Sgt. J. M. Thomas, USMC	268	7.50
3. Pvt. T. Krause, USMC	268	5.00
4. Sgt. B. G. Betke, USMC	263	5.00
5. G. Sgt. H. M. Bailey, USMC	263	4.00
6. Pvt. A. F. Porgorzelski, USMC	260	
7. Lt. R. E. Vermette, U. S. Inf.	259	
8. Capt. N. A. Hedden, U. S. Inf.	253	
9. Lt. L. A. Hohn, USMC	252	
10. B. Rames, U. S. Inf.	251	

COMPANY TEAM MATCH, STATE

	Score	Prize
1. Troop B, 102d Cavalry, N. J. 1st Team	1545	Medals and Trophy
2. Troop B, 102d Cavalry, N. J. 3d Team	1413	Medals and Trophy
3. Troop B, 102d Cavalry, N. J. 2d Team	1350	Medals and Trophy

British "Big Bores"

By ELLERTON JAMES

REFERRING to the letter as to British big bores in the August issue of "American Rifleman" and Major Whelen's reply, of course, I don't claim to know as much on most subjects as Major Whelen, but perhaps on this particular question I know a little more, as I have actually used on the hunting field a Holland .375 and have also used in the hunting field a Springfield, and I have also been shooting big game, principally moose for about 25 years.

I should say that the rifle that the inquirer wanted is the Holland .375, provided he is willing to pay the price. All the figures as to the Holland came out in "The American Rifleman" within the last six months. Roughly speaking, it has the trajectory of a Springfield and more muzzle energy than the .405. With all due respects to Major Whelen, the Springfield is not heavy enough for moose in our thick Eastern woods and again with all due respects to Major Whelen, even good sportsmen have at times either to forego their trophy or shoot into a piece of black hide, because it is absolutely impossible to get any closer or see any more of the game. Therefore, you have got to have a rifle that will put your moose down or cripple him no matter where you hit him, and the Springfield will not do this. The .405 will, but over one hundred yards the trajectory is not flat enough. The .375 will with either the 235 gr. bullet, and at the same time the trajectory is so flat that you do not have to worry whether or not the moose is 275 or 200 yards.

With the .375 Holland I have had practically no more trouble with metal fouling than with the Springfield, using the ordinary bullet. I have never tried the gilded bullet. Up to 300 yards, and that is about as far as any ordinary shooting is done, the accuracy of the .375 is plenty good enough for all hunting purposes, especially with the tremendous smashing power that the bullet has even at long ranges. With regard to the recoil, put on a rubber butte-plate and forget it. Without the rubber butte-plate the recoil is about equivalent to a heavily loaded 10-bore shotgun; very little heavier than the .405.

I can't speak definitely about the behavior of the ammunition at different temperatures, but I have seen ammunition shot that had been taken to Africa and back again, and the accuracy was perfectly adequate for all hunting purposes. I was testing out the other day a .350 Magnum Rigby with ammunition ten years old and we could make as good patterns with it as we could with the Springfield.

It should, furthermore, be noticed that the Englishmen have been for years taking these rifles into Africa and killing game with them with very satisfactory results, and the Englishman who goes to Africa hunting is not

usually willing to put up with anything except the best in the way of rifles.

I have an intimate friend who has been all through Africa and shoots nothing but Holland rifles, 275, 375 and 465, and he says he has absolutely no trouble with metal or powder fouling in any of them. The 275 gives a little more trouble than the others, but no more than the Springfield.

What Major Whelen says, however, is absolutely true, that it is a very exceptional man who can hold these heavy rifles with any degree of consistency for ten shots. There are men of this kind in England, because they have been shooting them for years, but we haven't got them in this country. Personally, at the end of 25 rounds I think I have had about enough, though no more so than after I was shooting a 405; but no man in the field ever shoots 25 rounds in a day consecutively.

As far as the life of the barrel goes, any one of the English rifles will keep its accuracy up to four or five hundred rounds, and it takes a good many years to fire four or five hundred rounds, shooting big game in the field. As a matter of fact, an English rifle, which had been shot a good many thousand rounds still kept what I call its hunting accuracy.

As I have said once before in a letter to the "Rifleman," it is always to be remembered that these English rifles are hunting rifles and not target rifles, and the whole idea is to combine sufficient accuracy with sufficient "wailop" to get the game even when you can't place your shots.

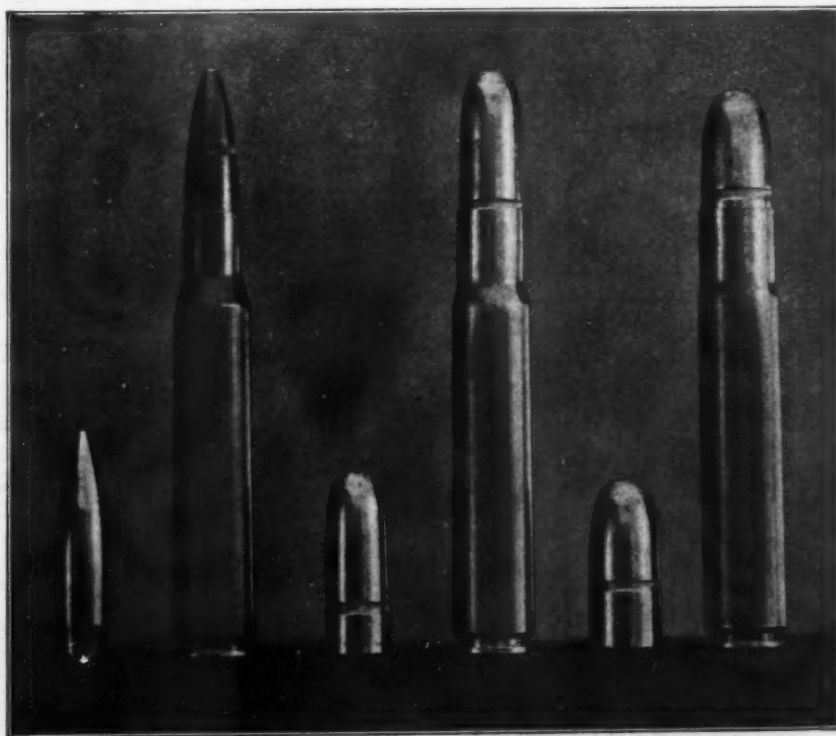
The .35 Whelen

(Concluded on page 3)

ridge and rebores it to this .35 caliber, and get very satisfactory results from it, and although such a barrel will not give quite the accuracy of the ideal barrel we designed for this cartridge on account of its rather light weight, yet the difference in accuracy will not be noticeable except by a very skilled shot.

I think that time will show that this rifle and its cartridge are very ideal for the sportsman who wishes a powerful and accurate weapon for the larger American game. It has not the power or bone smashing qualities of the .400, but it certainly is ample in this respect for all of our game, and one can probably assure a larger proportion of hits at very long sporting ranges than he could with the .400. In other words, the .400 is more of an African rifle, and this .35 is more of an American rifle.

I have had lots of pleasure in developing these two cartridges and the rifles for them, and I now turn them over to American riflemen for their benefit. It has been remarkable to see how much could be done to improve a rifle when one had interested workmen of the finest skill to assist him. While, as I say, no attempt was made to make the most powerful cartridge and rifles in existence, yet we did attempt to give ample power in combination with the very best accuracy, reliability, finish, balance, and adjustment, and I think that in all these respects we turned out something that it will take the world a long time to beat.



.35 and .400 Whelen cartridges and bullets with the .30 Springfield shown for actual comparison.

THE DOPE BAG



A free service to target, big game and field shots, all questions being answered directly by mail.

Rifles and big game hunting: Maj. Townsend Whelen.

Pistols and Revolvers: Maj. J. S. Hatcher.

Shotgun and Field Shooting: Capt. Charles Askins.

Every care is used in collecting data for questions submitted, but no responsibility is assumed for any accidents which may occur.

Weapons for African Game

By Townsend Whelen

Knowing you to be an authority upon the subject, in addition to being a good sportsman, I am taking the liberty of addressing a few questions to you. I would be very greatly obliged if you would favor me with the benefit of your advice.

Your time is valuable, therefore I would feel better if you would charge for your advice.

I wish to go to Africa and elsewhere on a hunting expedition. I have killed a few bear and elk in the west but I am a poor marksman.

I have a Westley Richard .425, but that is too large and ammunition too expensive to practice target shooting.

What is the best course for me to pursue? Get a regular bolt action rifle for use in target practice and have a sub-caliber chamber made for it? Will it be sufficient to practice kneeling and standing at 50 to 200 yards? The Whelen .400 should be a better gun than the Winchester .401 or .405. Is it sufficiently powerful to shoot a rhino or lion? Would you be kind enough to give me the address of some big game hunter from whom I can obtain some information?

Which is the better rifle for big game—bear, the Kadiak bear of Alaska and the African big game—the .35 Whelen or the Whelen .400?

Really, sir, I apologize for bothering you with so many questions.

I am in receipt of your letter of July 26, relative to rifles for Africa and information on the country.

No one rifle will do for Africa, two are absolutely necessary. A light, accurate, flat trajectory, and fairly powerful rifle is needed for antelope and plains shooting. It should not be so powerful that the sportsman cannot shoot it accurately due to recoil but at the same time it must have sufficient power to kill the medium game of Africa neatly. This African game is harder to kill than our own American game, and the lighter rifles we find suitable for our game are not at all suited to African medium big game. This rifle should be heavy enough for lion in a pinch. It should also be a long range weapon. In plains shooting much African game must be shot at ranges over 200 yards.

A heavy rifle is also essential because the light rifle will not be nearly heavy enough for

the larger African game such as rhino, buffalo, and elephant. Some of this game is liable to be dangerous at times, and it is suicidal to face it armed only with a light rifle. This heavy game is shot only at short range, usually under 50 yards, and extreme accuracy is not essential. So this big rifle may be heavy as it will almost always be carried by one's gunbearer.

For the light rifle there is absolutely none made that will equal the sporting type of Springfield rifle for a minute. We find that a great many of the English professional hunters in Africa, including Cunningham, the most celebrated of them all, are obtaining Springfield sporting rifles. I have been instrumental lately in getting a number of these men such rifles. The best ammunition for the Springfield for Africa is that loaded with a 180 grain, pointed, expanding bullet, giving a muzzle velocity of 2700 feet per second.

If you use a Springfield for a light rifle, then it would be very wise to use a heavy rifle having the same general type of breech mechanism. You will thus be handling a rifle you are familiar with if it comes to a tight corner with dangerous game. There is nothing better than your present .425 Westley Richards Mauser.

No rifle is so good that it will make a poor shot shoot well. It is exceedingly unsportsmanlike for a poor shot to attempt game shooting—in fact, it is criminal. He has no business with a rifle in his hands in the game fields. He causes needless suffering, and he constantly aggravates everyone he is with. He spoils the trip for himself and all his friends. In Africa, in addition, he is in constant danger from the more dangerous game. Why spoil an expensive and long planned trip to Africa because of a little laziness in neglect to both study and practice the art of rifle marksmanship. Anyone can become a good shot, but it takes a reasonable amount of both study and practice.

You have available a number of good works on rifles and marksmanship. There is a civilian rifle club affiliated with the N. R. A. in Birmingham, where you can practice and the members will be only too glad to coach you. Rifle shooting is best and quickest learned by participation in Small-Bore Shooting with a .22 caliber small-bore rifle. (I do not mean the usual .22 boy sized repeater usually seen.)

I should strongly advise you as follows:

1. Become an annual member of the National Rifle Association.
2. Become a member of the civilian rifle club at Birmingham, Alabama, and participate in

their shooting, particularly in their small-bore shooting.

3. Subscribe to "The American Rifleman," a copy of which is being sent you.

4. Obtain and study "The American Rifle," particularly Part II relating to rifle marksmanship.

5. Obtain a .22 caliber Springfield Model 1922 rifle, learn to care for it and to use it.

6. When you become proficient with the .22 obtain a .30 caliber Springfield of sporting type, and continue your practice with it. With these rifles, and your .425 Westley Richards, and a 12-gauge shotgun you are fully equipped for African sport so far as your weapons and marksmanship are concerned.

There is also required a knowledge of African game and the country, how to subsist, travel, and hunt; how to care for yourself in emergency, where to go for the best hunting, how to plan your trip, etc. Fortunately we have a wealth of literature on this subject, but this literature needs careful selecting as one might read a dozen books and not get one that was really useful.

To obtain a general idea of the present-day conditions in British East Africa (now called Kenya Territory), as well as the conditions under which the modern sportsman hunts in that country, there are no better books than "African Game Trails," Roosevelt-Scribners, and the two books of Stewart Edward White, "African Camp Fires," and "The Land of Footprints," Doubleday, Page & Company, Garden City, L. I. The two best books on plains and brush hunting (which are entirely different), tracking, and the kind of country to look for certain game in are "The Game of British East Africa," and "African Game and its Spoor," both by Captain C. H. Stigand—Horace Cox, London. The running of one's safari, the management of your head man, gun bearers, tent boy, askaris, and porters, and all the details of camp life and transportation, proper camp equipment, etc., are quite a problem, and are best covered and explained in "The Land of the Lion" by W. S. Rainsford—Doubleday, Page & Company, Garden City, L. I. Another good book, particularly because it contains a vocabulary and instructions in the Swahili language, the universal trade language of Africa, that is so necessary in dealing with your natives and safari, is "The Big Game of Africa" by Richard Tjader, Appleton, New York. Perhaps the best books on the big game, its life histories, habits, and characteristics, are "Life Histories of African Game Animals," by Roosevelt and Heller—Scribners, N. Y., and "African Nature Notes and Reminiscences" by F. C. Selous, Macmillan, New York. On the hunting of the elephant the very best book is "Elephant Hunting in East Equatorial Africa" by Arthur H. Neumann—Rowland Ward, London. Neumann was the most successful professional elephant hunter who ever lived, a great character, and his spirit still goes marching on in British East Africa where he hunted long before the country was known or there was any settlement. Every hunter who goes to Africa always takes along a copy of "Records of Big Game," by Rowland Ward, London. It enables one to identify the various species of game, some of which are very closely allied, and it tells you how near your specimen comes to the record.

The two classics on African hunting, which everyone should read as a part of his education, because they are most delightfully entertaining, because everyone refers to them and their celebrated authors almost constantly, are "A Hunter's Wanderings in Africa," by F. C. Selous—Macmillan, N. Y., and "Wild Beasts and their Ways" by Sir Samuel Baker, Macmillan, N. Y. Every sportsman should own these two books. They, and some of the others mentioned herein, are out of print and hard to obtain, but they can still be gotten by diligent search in New York or London.

While we are on this subject of books I want to recommend another, which, while it does not deal entirely with Africa, is well worth reading because it is so well written, so delightfully written, so intensely interesting, and because it shows just that kind of gentlemanly sportsmanship, and touch with science, which we should all emulate in our hunting and sport. This is "A Sportsman's Wanderings," by J. G. Millais, Houghton, Mifflin & Company, New York. It is well worthy of a place in any man's library.

After reading the above works one will be most thoroughly prepared mentally for an African hunting trip, and he will get very much more out of it, do it much more efficiently, and have much more enjoyment than if he went in ignorance of the country, its game, and its people. After perusing these books you will no doubt have certain specific questions to ask. Send them in and I will do my best to answer them, or to get answers from some of my friends who have had much experience in Africa.

THE WINCHESTER C. F.

FOR the benefit of the members of our club and others who I am sure would be interested, will you please tell us something about the .22 Winchester center-fire cartridge, and in what arm it attained its best efficiency. It would seem that it would have a place between the .22 long rifle and the .22-20 or .25-20. What is its range of accuracy and how would it be reloaded for best results; also what class of game is it adapted for for a clean kill? As a target cartridge?

What are the weak characteristics of the 7.62 mm. cartridge, the type used in the Russian rifles? Has it a rimless case? What bullet and powder is it charged with? Can it be re-primed with domestic primers? How did the government happen to come in possession of these Russian rifles?

A. L. N., Santa Monica, Cal.
Answer (by Maj. Whelen): The .22 W. C. F. cartridge, so far as I know, is regularly loaded only with black powder. The bullet is 45 grains, M. V. 1560 f. s. Were it accurate and could be speeded up to about 1800 f. s. it would be an ideal small game cartridge. As it is, it is pretty good, although factory cartridges are liable to be stale and of poor accuracy. As to its power and killing qualities, it is fine for all small game up to turkey and woodchuck. It is very much better for such game as squirrel and grouse than the .25-20, which has excess power and badly mutilates such game. From time to time enthusiasts report excellent results with this cartridge, reloading with low pressure smokeless powder such as Du Pont No. 75 and 80, and a hard bullet slightly oversize. But as a usual thing these small cartridges are quite cranky. They require a particular combination of powder and lead to do their best work, and with the least variation from this they seem to do very poorly.

The weakest characteristics of the 7.62 Russian rifle are the war-time ammunition and war-time barrel. There is no reason why well-made ammunition, and well-made barrels, fitted to each other, of the Russian design should not shoot well. My impression is that this ammunition of Remington make will take the same primer as the .30-06. About 20,000 rifles were bought at the start of the war with the idea that they might be useful in arming our home guard.

A BULLET FOR SPRINGFIELD AND Krag

I AM writing you for some information relative to a reduced load for the Springfield as well as the Krag. I expect to purchase a Bond tool, Model B, for reloading both Springfield and Krag cartridges (.30-06 and 30-40) and would like to know if the reduced load for the Krag as suggested by you in May 15th "Arms and The Man" to L. J. H., Easton, Md., could also be used in the .30-06 cartridge successfully. I expect to get the Bond mould No. A-31870 150-grain bullet for both the .30-06 and 30-40. Now for primers and powder. What about King's semi-smokeless powder, also Du Pont No. 1 for these reduced loads? I know nothing about either. What about primer (U. S. No. 9 and Remington No. 8 and 9) offered by Sportsman's Service Association at \$1.80 per thousand, are they O. K. or would the primers for sale by the D. C. M. be better?

Can bullets be properly and satisfactorily lubricated through bullet resizing die in Bond tool. Can you tell me where I can obtain ideal lubricating and sizing machine and what will be the cost of same. Is this machine made to lubricate only one size bullet, or is it supplied with separate dies for different size bullets? I am unable to get anything from the Ideal Mfg. Co.—not even an answer to my letters.

Can you tell me where I can have Krag rifle barrel cut off and have Springfield front sight base and Lyman No. 34 receiver sight fitted on same, and what would approximate cost be.

Please tell me what you can about bluing solution advertised by F. L. Hoffman, Fredericksburg, Va. In applying this solution to an arm, does the old blue have to be removed or can it be applied to certain parts of the arm where blue has worn off?

Answer (by Maj. Whelen): Bond bullet No. A-31870 150 grains should work well in both the Springfield and Krag. Bullet should be case of an alloy of about 10 parts of lead to one part of tin. It should be lubricated and sized to .311 inch. In sizing it I consider a lubricating and sizing machine as absolutely necessary. Writers on reloading usually try to dodge the necessity for this tool on the ground of expense, but I have never been able to get satisfactory and accurate results without it, and I know no one else who has. The Bond Company make an excellent sizer and lubricator. The punches and dies are interchangeable. A different die and inside punch are needed for each diameter to which you wish to size bullets. A separate tool punch is needed for each shape of point of bullet. The Bond Company furnish excellent stock

lubricant to go with the machine. The machine with complete dies and punches for sizing bullet No. A-31870 to .311 inch will cost \$12.00. I do not know the cost of the extra dies and punches—probably 50c. to \$1.00 each.

The fit of the necks of the cases is very important. The mouth of the case should be slightly chamfered to prevent capping the bullet as it is seated. There is a little reamer on the Bond reloading tool that does this very well. Then the neck of the fired case must be resized in the resizing die, and afterwards expanded in the expander chamber with a die measuring .311 inch. Do not crimp the bullet in the case. Seat it so that at least one band projects from the mouth of the case.

King's Semi-smokeless powder is not suitable for reduced loads in high power rifles of quick twist. There is so much fouling that accuracy cannot be maintained for more than three or four shots. Du Pont No. 1 is all right, but it is obsolete and hard to obtain. The best powders are Du Pont No. 75 and Du Pont No. 80. In the Krag with 150-grain lead bullet use 10 to 12 grains of No. 75 or 80. In the Springfield use 11 to 13 grains of No. 75 or 80.

Any first-class gunsmith accustomed to doing rifle work can cut off the barrel of your Krag rifle and fit a Springfield front sight and Lyman No. 34 receiver sight. A fair charge for such work is the cost of the sights, plus \$2.00 per hour for the labor. I imagine the labor in this case would amount to about \$4.00.

The Hoffman bluing solution is very satisfactory. The part to be blued must be polished absolutely bright and smooth, all old bluing being removed and every trace of grease and oil. For barrels a special metal trough with burners underneath, in which the barrel can be boiled is necessary. The application is quite intricate, and is described in full in "Amateur Gunsmithing," which will be published by the N. R. A. in about two months.

THE 505 GIBBS

I SHOULD like to trouble you with a few questions. Do you think there are enough .505 Gibbs Magnum Mauser floating around this country to make it possible to obtain one in good second-hand condition through advertising? Should like this rifle for experimental purpose only and do not care to pay the excessive price and duty that England asks for them. If a sliding or falling block action such as W. W. Green puts on his single-barrel express rifles could be obtained would "Niedner or Griffin & Home" be capable to make a .505 barrel to fit same? Or on account of this being a rimless shell do you think it impractical? When it comes to the big shells we seem to be somewhat limited as to actions this side of the pond. Is there any difficulty in obtaining loaded cartridges, bullets or primers from across. Sometime previous you stated in "Arms and The Man" that you have this .505 shell with 100 gr. Ex. 1076 powder. What accuracy was obtained up to 200 yards with this loading?

H. T. K., Buffalo, N. Y.

Answer (by Maj. Whelen): So far as I know only two .505 Gibbs rifles have been imported—one by a friend of mine which was the one with which I experimented, and one that month ago was for sale by Von Lengerke and Detmold of New York. I hardly think an advertisement would bring any answer.

Bullets and empty cases can readily be imported by parcel post. The trouble is with the primers. All steamship companies absolutely refuse to carry them. My friend had some brought over by a friend of his.

A .505 barrel could readily be fitted to a good English falling block action by Niedner, but as he would probably make only one such barrel, the cost of the rifling head, cutters, boring tools, and chambering reamers would have to be met by the man ordering the barrels. These would cost probably \$500.

The rifle for which I developed the load of 1076 powder I tried only at 100 yards. Owing to heavy recoil and open sights I got about a 5-inch group for ten shots. Ten shots are about as many as any man would want to fire in one day. It is most decidedly and purely an elephant rifle.

A .30-06 MAUSER

I HAVE looked through all my back numbers of Arms and The Man to find out if a .30-06 Springfield barrel can be put on a 7 mm. Mauser action. I believe it will work with the 8 mm. but am in doubt as to the 7 mm.

Will you be kind enough to straighten me out on this? Should I send the complete rifle or where the D. C. M. directs me or just the barrel and receiver, that is if you can answer in the affirmative. What I have in mind is a pre-war Mauser.

F. N., Suffern, N. Y.

Answer (by Maj. Whelen): Strictly speaking, a .30-06 Springfield barrel can not be fitted in its original condition to a Mauser action. The barrel thread on the Mauser action is much larger than that on the Springfield receiver, and the thread is entirely different. The ex-

tractor cuts are also different. Griffin & Howe, Inc., 234 and 236 East 39th Street, New York City, N. Y., have fitted a large number of .30-06 Springfield barrels to Mauser actions in most excellent manner. They cut off the barrel about an inch at the breech, rethread for the Mauser action, and re-chamber it, fitting it to the correct headspace for the Mauser bolt. It is very necessary that one procure from the D. C. M. a .30-06 Springfield barrel, sporting type, with same outside dimensions as .22 caliber Model 1922 barrel, without rear sight fixed base, with front sight fixed and movable studs, polished and blued from breech to muzzle. Such a barrel costs \$8.31, packing 50c.; total, \$8.81. The regular military barrel is not suitable as it is so small at the breech that it does not offer enough shoulder to screw up tight against the Mauser receiver. Griffin & Howe can quote you a price on this work. Government Arsenal do not do work of this kind.

There is no difference between Mauser receivers in 8 mm. or 7 mm. Both will usually handle the .30-06 cartridge, or can be made to do so by slightly reaming out the forward part of the magazine. In case you do not already have an action, Griffin & Howe, can provide you with a first-class Mauser action for the .30-06 cartridge, and can fit it with either a Springfield barrel or with a special .30-06 barrel of their own make, and can also stock it for you. I am enclosing a circular of this firm which will give you much information.

WHAT IS A MAXIMUM LOAD?

SOMETIME back in answering a question in the "Dope Bag" you advised against the regular use of maximum loads, saying that many men were using them without having the proper knowledge. Is care other than using good non-war-time cases and careful weighing of the powder charge necessary?

My idea of maximum charge is one developed around the upper limit of pressure for a given rifle. Is this correct?

I wish to reload my Krag cases (really, the I freshly loading from empty cases bought of the D. C. M.) with Du Pont No. 20 and the 220-grain bullet. As listed in "Cartridges and Loads for American Rifles" the proper charge is 36 grains, developing to 75 f. s. at a breech pressure of 41,000 pounds per square inch. Now, is this load perfectly safe or is it too close to 43,000 for safety? If unsafe, what would be a better load of the same powder?

Can you recommend a load of Du Pont Shotgun Powder for the Krag similar to the Paine load for the Model 1903 rifle? Must the 170-grain flat base or may the boat-tail be used?

Do you have any knowledge as to usefulness, field at 100 yards, power and durability of the "Malcom" Telescope, equipped with mounts for use on the 45-70, Model 1886, Winchester?

In the July 15, 1922, issue of The American Rifleman you advise the use of strychnine for snake bites. Would you specify details?

J. D. R., Irvington, N. Y.

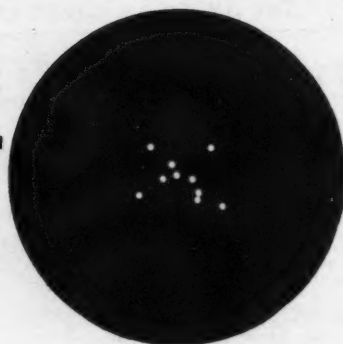
Answer (by Major Whelen): I would call a load maximum, for example, if it gave over 48,000 pounds pressure in the Springfield or 40,000 pounds in the Krag. Caution is necessary with these loads because so many try to use them without sufficient knowledge. For example, they measure their powder with no reference to scales. They use scales not standardized. They use loads developed in the loose chambers of Springfield and Krag in rifles for these cartridges made with exceedingly tight chambers. They also frequently exceed the recommended loads by a grain or so, which is extremely dangerous practice, as even as little as a grain sometimes changes a safe maximum load into a dangerous one. Also often wartime cases of poor brass are used. A man who has studied the subject will not make these errors, and for him maximum loads are safe.

The load of 36 grains of Du Pont No. 20 and 220-grain bullet is perfectly safe in the Krag. I have used it many times and it gives excellent results.

Try 16 grains of Du Pont Shotgun Smokeless with the 170-grain flat-base bullet as approximately the Paine load in the Krag. You will get a little better results if you will load this bullet projecting considerably further from the case than standard, thus letting the bullet extend well up into the throat, using the rifle as a single loader (the long cartridge will not work through the magazine). Loading the bullet out this way you will not get it secure in the case if you use the boat-tail bullet, also I think that perhaps the boat-tail may keyhole at these low velocities.

Malcolm telescopes are well and honestly made for their day. They should still be all right for black powder rifles, but I think the sharp recoil and jump of the modern high velocity rifle will probably jar the lenses loose in their cells after a little while.

For snake bite one of the best remedies is potassium permanganate injected hypodermically around the wound. Strychnine is used afterwards as a heart stimulant in case the pulse becomes low. The use is fully explained on pages 426 to 443, Volume 2, of Kephart's "Camping and Woodcraft."



More Records

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The Protection of Firearms Against Corrosion

By

Wilbert J. Huff

Research Chemist, The Mellon Institute

Pittsburg, Pa.

* * * * *

The writer, while a member of the research staff of the United States Bureau of Mines, was assigned the general problem of corrosion under oil films, with special reference to the after-corrosion of firearms. The results have been published in various media, one of which is Technical Paper 188, Department of the Interior, Bureau of Mines, "Corrosion under oil films, with special reference to the cause and prevention of the after-corrosion of firearms," by Wilbert J. Huff, and have been the subject of rather widespread comment.

It is probable, however, that many riflemen have never seen these publications, since they were written primarily for the readers of science. However, the findings relate to matters of fundamental importance to every user of firearms, so it appears advisable to present here some of the important conclusions obtained.

The violent corrosion which often attacks the bores of firearms, even after these have been carefully cleaned and oiled, has been attributed to a great many different possible causes, such as: smokeless powder residues, the occlusion of acid gases during firing, metal fouling, acid primer deposits, or primer salts. In accord with such various conflicting theories a large number of cleaning processes have been proposed and a number of nitro-solvents, gun oils, gun pastes, gun greases and other cleaning agents have been placed upon the market. Some authorities have recommended such drastic agents as aqua ammonia, or concentrated sodium carbonate solutions.

The investigation dealt with all of these matters thoroughly, and definitely established the causes and the remedies for after-corrosion. It is unnecessary to repeat here a description of the experiments performed, or to develop the process of scientific reasoning by which the problems involved were solved. The reader interested in such matters can refer to the publications previously mentioned. Suffice to state that the chief cause of this violent corrosion was shown to be a salt, potassium chloride, deposited in the bore of the piece by the explosion of the primer.

This salt is not acid, and does not attack the metal of the bore. However, it does deliquesce—that is, attracts water when exposed to high atmospheric humidities. The salt remains lodged in the pits and tool wounds of the bore even after the piece is carefully swabbed, and draws the water even through a layer of oil or grease. This water thus comes into intimate contact with the metal of the bore, and corrosion follows after the lapse of only a short time.

The proper remedy requires the removal of the potassium chloride. This can only be accomplished by dissolving it. For such a purpose aqua ammonia or the sodium carbonate solution may be used. However, the chemicals are not necessary, and indeed serve no useful purpose here. If improperly applied, or introduced into the mechanism, they may do considerable harm. The potassium chloride is readily dissolved by water, and water alone may be used, provided it is at once swabbed out and the piece thoroughly dried. The writer was the first, so far as he is aware, to advocate the use of a water cleaning process. A great many riflemen have since adopted this, and in the hands of careful workers it has proven very successful and has received many favorable comments.

However, there is a deep seated prejudice against the use of water in cleaning. Many fear that it will be introduced by accident into the breech mechanism, from which it can be removed only with difficulty, or in which it may remain unnoticed to cause corrosion. In many rifles it is difficult to dismount the barrel or to so prepare the piece that water may be used safely. For such reasons there exists a real need for a suitable solvent, which will dissolve the chloride, and which will not corrode or attack the piece if it is allowed to remain in the piece for some time.

To determine whether or not such a solvent or gun oil could be purchased, the writer obtained a number of widely advertised preparations used here and abroad. These were analyzed in the laboratories of the Bureau of Mines and submitted to firing tests by the writer. None filled the need.

The number of failures in the corrosion tests is striking. Many of the mixtures are not only inadequate but, because of the false sense of security that their use may induce, are even dangerous.

It is clear, therefore, that not one of the commercial preparations now on the market can be considered satisfactory. The cause is at once apparent to the chemist. Not one contains a solvent for the potassium chloride, consequently this salt remains to cause corrosion.

For this reason the writer has previously advocated the water cleaning process. Recently, however, when the disadvantages of the water process were brought forward, it seemed advisable to develop an entirely new type of cleaning material, which would readily dissolve the chloride, and which might be left in contact with any of the metal parts of the piece for a considerable time without causing any harmful effects. Such a cleaning material was devised by the writer. When swabbed out, it leaves upon the bore surface an oily coating which readily blends with the oil or grease subsequently applied. Because of these properties—that of dissolving the potassium chloride and of blending with oil—it has been named "Chloroil."

Chloroil has been carefully tested in all manner of small firearms and machine guns by a number of independent investigators. In every case it has prevented after-corrosion without harming the piece. It is not yet commercially available, but will be placed upon the market in the near future by the

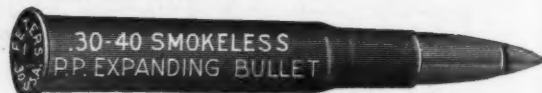
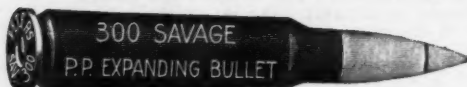
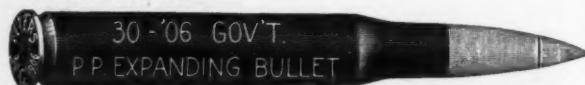
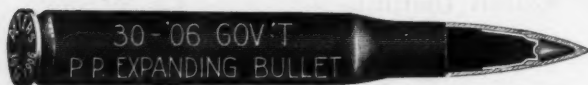
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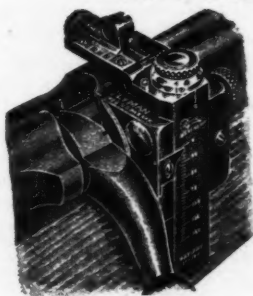
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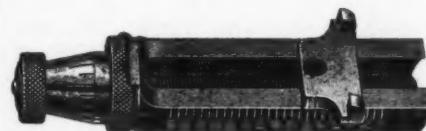
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The Five Who Fought Five Hundred

“REMEMBER THE ALAMO” was the war-cry of the Texans in their war for independence, after the small company, commanded by Crockett and Bowie had gallantly held the fort until only five remained.

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